

IN THE
DISTRICT COURT OF THE UNITED STATES

NORTHERN DISTRICT OF CALIFORNIA

SECOND DIVISION

SPRING VALLEY WATER
COMPANY,

Plaintiff,

VS.

CITY AND COUNTY OF
SAN FRANCISCO ET AL.,

Defendants.

Nos. 14275, 14735, 14892
15131, 15344, 15569,
26, 96.

**REPORT OF H. M. WRIGHT, STANDING
MASTER IN CHANCERY, AND
SUPPLEMENTAL REPORT**

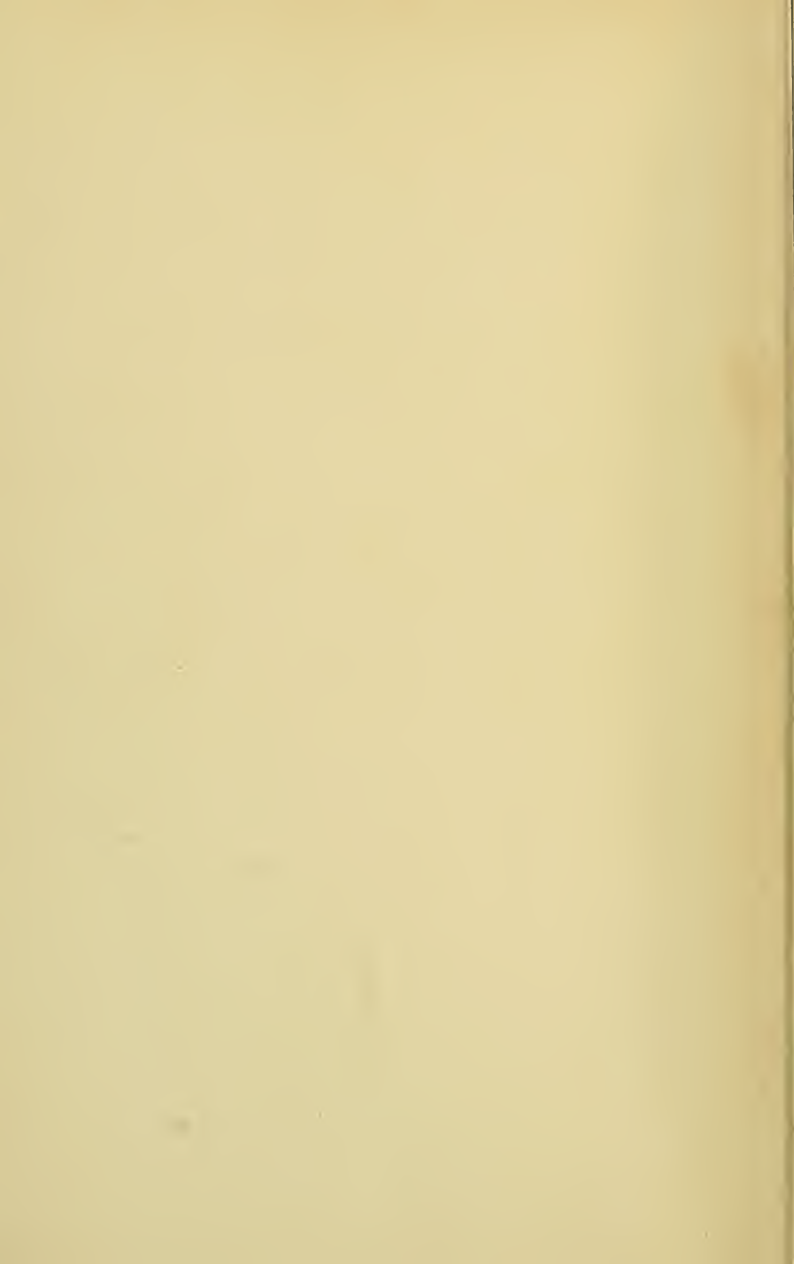
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W. B. MALING, Clerk.

By J. A. SCHAEZTZER, Deputy Clerk.

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IN THE
DISTRICT COURT OF THE UNITED STATES,
 NORTHERN DISTRICT OF CALIFORNIA,
 SECOND DIVISION.

SPRING VALLEY WATER COMPANY, Plaintiff,

vs.

CITY AND COUNTY OF SAN FRANCISCO et al., Defendants.
 Nos. 14275, 14735, 14892, 15131, 15344, 15569, 26, 96.

**REPORT OF STANDING MASTER IN CHANCERY ON FINAL
 HEARING.**

To the Honorable, the Judges of the United States District Court,
 Northern District of California.

The report of H. M. Wright, Standing Master in Chancery of
 the above-entitled court, respectfully shows:

The eight suits in equity here reported upon were referred to
 the master by separate orders in open court, issued upon consent
 of both parties, the first seven on January 5, 1914, and case num-
 ber 96 on July 12, 1915. By these orders, I was directed to take
 and report the evidence, together with my findings of fact and
 conclusions of law thereon. I follow my usual practice of accom-
 panying these findings and conclusions with my reasons; the report
 would otherwise be difficult of understanding or adequate review.
 On July 12, 1915, these eight suits were, by consent, consolidated
 for hearing.

[2] Shortly after the first orders of reference, the parties were
 called before me in a preliminary meeting to consider methods of
 presenting the facts, and the hearing set for a date in the summer
 of 1914. Meanwhile, the parties began and concluded negotiations
 upon a proposal of settlement, involving purchase of the plaintiff's

NOTE.—Cross-references to other pages of this report refer to the paging
 of the typewritten original report, herein indicated by full-face type in
 brackets. References to pages of the argument are to the typewritten
 transcript.

properties by the city, and the hearing was at the parties' request postponed without day to afford an opportunity to the electors of San Francisco to vote upon the purchase. The election was held in April, 1915; the proposal of purchase failed of ratification by the people. Thereupon, by agreement of the parties, a preliminary meeting was set for June 21, 1915, and held, and the taking of evidence was set for and was begun on July 12, 1915. The hearing before me continued without interruption, except for a month's adjournment over the Christmas holidays, until May 5, 1916. On July 13 and on August 10, 1916, further evidence of a supplementary character was heard. The cause was orally argued on August 10, 1916, and thereafter, and was submitted for decision on September 1, 1916.

At the request of the parties, the testimony and the arguments were reported stenographically and transcribed by Charles R. Gagan and E. W. Lehner, competent and disinterested reporters, appointed by me for the purpose. The testimony, in 19 bound volumes, covering 11,222 pages, is separately returned with this report, and is a true transcript. The exhibits, over 235 in number, are also separately returned. The said testimony and the said exhibits constitute all the evidence upon which this report is based. For the court's information, I also separately return the arguments, in 17 pamphlet volumes, of 2145½ pages.

Counsel appearing were: for the plaintiff, E. J. McCutchen, Esq., Warren Olney, Jr., Esq., and A. Crawford Greene, Esq.; for defendants, Robert M. Searls, Esq., and Jesse H. Steinhart, Esq., Assistant City Attorneys. Mr. Steinhart resigned his office [3] about three months after the hearing began. The case has been tried with great ability, industry and fairness on both sides. All counsel concerned have borne constantly in mind that their duty was to assist the master in ascertaining the exact facts in an enormous mass of conflicting evidence; and to that end testimony has been restricted, so far as it could be, to matter of plain pertinency, useless argument and contention between counsel have been avoided, facts capable of proof have been freely admitted, and mutual concessions made and agreements reached where differences were not great. Special commendation should be given to the city's attorney, Mr. Searls, who, as stated, has practically single-handed presented the city's case, and with an ability, untiring industry and a fair partisanship that were a credit to him and to his client.

In hearing this case I have effected certain modifications in the usual method of presenting the evidence, dictated by my experience in like cases. Prior to the opening of the case, in fact at the first preliminary meeting in 1914, I suggested an avoidance of the usual multiplication of expert witnesses by a restriction to one on each subject; but at the request of both plaintiff and defendant, I allowed two, with the privilege of additional corroboration in details, at my discretion. Further, it was directed that, instead of the usual procedure in trials, where the parties each presents his whole case, here covering many complex subjects, in succession, the evidence should go in complete on each side, by reference to the subject-matter under consideration. The order adopted was substantially this: lands, concrete, earth dams, flumes, riveted pipe, submerged pipe, brickwork, reservoirs, tunnels, buildings, overhead allowances, cast-iron pipe, depreciation, original costs, rights of way, water rights, going value, financial data, rating base. Thus we attained, not merely a convenient segregation in the record of related evidence, but, by simultaneous discussion, a clarification [4] and crystallization of the issues. In addition, I was able to form tentative conclusions as the evidence went in, thus enormously reducing the time and the difficulty of reaching a decision. Finally, in the engineering evidence, I assimilated the proceeding to that of an arbitration between engineers. The engineers were encouraged to give their direct testimony without question and answer, and in succession; cross-examination by attorneys being deferred until the direct testimony was completed. The engineer witnesses were allowed to question each other. Also, as I feared from experience that for strategic reasons a strong witness might not be fully cross-examined, I required each witness to give in full, upon direct, his reasoning processes and supporting data underlying his appraisalment. The parties agree with me that the results have been most satisfactory. Apart from the important advantage of clarifying the evidence, a great saving in time and expense has been attained. This case has been tried and decided in about two years; by the ordinary practice, I estimate it would have taken three or four years. An extreme case is that of *Contra Costa Water Company vs. City of Oakland*, recently decided by me; largely presented under the old equity practice of hearing upon depositions, seven years elapsed before the evidence was in, another year before it was argued, and seven months were required for the master to digest and consider

the evidence, and submit a report. And that was a much simpler case.

Nature and History of the Litigation.

These are suits in equity filed each year from 1907 to 1914, inclusive, by the Spring Valley Water Company, a corporation of California, engaged in the public service of supplying San Francisco and its people with water, to enjoin the operation of ordinances of the Board of Supervisors of that city, passed each year, fixing rates of compensation for such water service for the respective fiscal years beginning July 1st. This annual [5] fixing of rates by the Supervisors was in accordance with the directions of Section 1, Article XIV of the Constitution of California, adopted in 1879, which section also provided that failure by water companies to observe ordinance rates should be a ground of forfeiture of their franchises and waterworks. The jurisdiction of this court is based upon allegations that the ordinances in question were, by reason of inadequacy of returns afforded by the rates prescribed, violative of the Fifth and the Fourteenth Amendments to the Constitution of the United States.

This case and its importance to the parties cannot be fully appraised in all its bearings without reference to other controversies between this water company and its predecessor company on the one hand and the municipal government on the other. There seem to have been controversies over rates of charge for water ever since the present State Constitution, adopted in 1879, committed the fixing of such rates to municipal legislatures. In 1903 was begun the first of a long series of suits in this court to enjoin the operation of rates fixed by the Board of Supervisors. This was followed by others in the two succeeding years directed against the rates passed for 1904-05 and 1905-06. In each case, injunctions *pendente lite* were granted. (124 Fed. 574; 165 Fed. 657.) A final decision of these cases in favor of the water company was rendered on October 21, 1911, by Judge Farrington. (192 Fed. 137.) Apparently neither party was satisfied, as no final decree or findings have been prepared or entered. The values fixed were of an earlier period than here involved, but, even with that qualification, the decision is not binding upon the parties and I am urged by the city attorney to give it no binding force (Argt., pp. 1380, 1806). There will, however, be found places in my report where I have considered Judge Farrington's findings in matters where it could readily be seen that his opinion would have weight

in crystallizing market value; and, of course, at all times I have studied his reasoning, both on [6] general principles and as applied to situations identical with many here presented.

In 1906, no suit was filed; it is alleged and not denied that "the ordinance was not contested for that the same on the face of the proceedings was and is void." In the years 1907 to 1914, the present eight suits were filed. In the year 1915, the city, in accordance with a constitutional amendment, relinquished its jurisdiction of rate-fixing to the State Railroad Commission, who will decide upon proper rates for the future.

Meanwhile at an early date in this history of contention, apparently prior to 1903, the city had begun to consider the acquisition of a publicly-owned water supply from sources in the Sierra Nevada mountains, with particular reference to the Hetch-Hetchy Valley at the headwaters of the Tuolumne River. In December, 1913, a grant from the United States of rights to that supply was obtained, an issue of bonds was voted, and some construction has been done and is now under way. Whether this action was taken in the belief that the plaintiff's sources would be inadequate for the city's ultimate needs or as an outgrowth of the contentions I have referred to, is immaterial; it seems now to be an element in the city's policy to acquire the plaintiff's property, if feasible, as a part of the mountain supply. The wisdom of this course is clear. Twice during these years an agreed proposal of purchase has been submitted to the people, but each time was rejected. On January 1, 1914, a complaint in condemnation of plaintiff's property, omitting portions thereof, was filed by the city, but has not been brought to trial. (Exhibit 230.) The city attorney stated on this hearing that it was not the city's intention to prosecute this condemnation suit, but to file another and in that case, to call upon the State Railroad [7] Commission for a valuation, as provided by law.

As a result of this controversy, the needed development of the company's water supply to care for increasing demands has fallen behind, and much money has been spent in litigation and contentious proceedings. The cases at bar represent an outlay of perhaps a half-million dollars by both parties. We are here concerned with the validity of eight municipal ordinances. They expired with the fiscal year for which they were declared operative, and the injunctive relief of this court is not needed to effect their demise. What we have to do is to determine the ownership of

about two and a half million dollars, the difference between the ordinance rates and the rates collected, a fund partly impounded and partly protected by a surety bond; and as incidental to that determination, to determine the value of plaintiff's property and the proper net return for its use in the public service. In this view, my reference to collateral controversies is, of course, in strictness unnecessary; but the manifest bearing of the issues here determined upon the other issues referred to, suggests frank reference to them. They are facts disclosed by the evidence and have increased the responsibility I have felt in deciding the cases at bar. The very full and able presentation of this case by the parties, combined with the respect in which this court has been held by the community, should now result in a settlement of all controversies, to the evident advantage of all concerned, provided only the master can meet the situation with an adequate wisdom as regards his findings, and with reasons persuasive to the minds of the parties and of the court.

The determination of the invalidity of the 1903, 1904 and 1905 ordinances has been referred to. In 1907, the Supervisors fixed rates reducing the rates of 1902-03 about 19 per cent. Suit number 14,275 was filed, a temporary injunction granted, and rates collected under the 1902 schedule, no money being impounded. [8] It has been stipulated that the ordinance rates would have reduced the actual revenue by \$250,000. In 1908, the Supervisors enacted the 1902 rates, with minor modifications. In suit 14,735, a temporary injunction was again secured; under this, for eight months of the fiscal year, that is, from November 1st, 1908, rates 15 per cent in excess of the ordinance rates were collected. In this and subsequent years, the excess over the ordinance rates was impounded with a special master under an order of the court. In each year thereafter to 1914, approximately the same rates of 1902 were enacted, the injunctions were granted, the 15 per cent (approximately) excess collected and impounded. The amounts impounded are: (Exhibit 124-3b.)

Case	14,735 (1908)	\$172,993.68
"	14,892 (1909)	298,675.64
"	15,131 (1910)	315,333.78
"	15,344 (1911)	334,097.21
"	15,569 (1912)	348,682.76
"	26 (1913)	366,735.91
"	96 (1914)	400,712.80

Upon these funds interest has accrued, and from them taxes thereon and special master's fees paid. The net amount impounded in the last seven suits was on January 1st, 1916, \$2,280,448.55.

The plan of trial adopted by both parties has been to treat the 1913 case as the principal case; to value the properties as of December 31, 1913, and determine the essential facts in the other years by addition and subtraction according to the facts of the inventory and records, aided by percentage adjustments adopted by agreement.

[9]

Historical Matter

Prior to 1858, the San Francisco City Water Works furnished the city with water from a small stream near by flowing into the ocean. In that year the Spring Valley Water Works was incorporated pursuant to an act of the legislature granting a franchise, which provided, among other things, that the incorporators Ensign and his associates, should be entitled to charge rates that would yield them not less than twenty per cent per annum on their actual invested capital. For a time, the two companies proceeded together in the service of supplying water, each serving different districts. In 1865, the San Francisco City Water Works properties were purchased by the Spring Valley Water Works. The latter company, and, since 1903, its successor, the Spring Valley Water Company, have ever since, with the exception of unimportant minor supplies from wells, supplied San Francisco with all its necessary water.

The supply has grown with the city and until recently has been entirely adequate. The foresight of the company throughout its history has been rather remarkable. For example, as early as 1860, when San Francisco had only 60,000 people, rights were acquired on the peninsula at Pilarcitos; and in 1875 lands were bought at Calaveras Valley, in Alameda County, which is only now under development as a source of supply. The system has expanded, unit by unit, as the need arose. The Lobos Creek unit, in San Francisco, now abandoned, was built in 1858; Pilarcitos, in 1862; San Andreas in 1871; Merced and Upper Crystal Springs, in 1877; Crystal Springs, in 1888; the first supply from Alameda Creek, in the same year; 1899 Pleasanton, and in 1900, the Sunol filter beds.

Description of the Spring Valley System

There is no need of detailed description of the works. [10] Unlike other localities, where water is available in adequate quantity from near-by rivers or lakes, San Francisco must rely chiefly upon the collection and storage of the winter flood-waters of distant streams, whose flow largely diminishes or disappears during our rainless summers. This has required, in addition to the usual engineering structures needed for the diversion and distribution of water, the provision of large areas for impounding reservoirs, surrounding watershed lands to prevent habitation and its resulting pollution, and water rights to assure the ability to divert the water elsewhere.

In all, the company owned on December 31, 1913, 99,505.56 acres of land, of which the company classifies 21,074.26 acres as out of use, and 78,831.30 acres as in use. Arranged by sources of supply, there are 2855.76 acres in the Merced source, 26,369.23 acres in the San Mateo County peninsular sources, and 49,472.12 acres in Alameda and Santa Clara Counties, the Alameda source, all classified by the plaintiff as in use. (Exhibit 12g.) The city contends that additional acreage should be excluded from valuation as "not in use". About half the water now used comes from the peninsular sources (including Merced), and half from the Alameda sources, across the bay of San Francisco. There are also owned riparian rights covering 48,490.12 acres, of which 18,623 are classed as out of use and 29,867.12 acres as in use. (Exhibit 12g.) The tributary drainage areas commanded by the sources named are: Merced, 7.61 square miles; San Mateo, 35.3 square miles; Alameda sources, 620.5 square miles.

The water from the Alameda sources is at present derived from underground gravel beds. At Pleasanton, wells in the Livermore Valley gravels, reinforced by pumps, deliver water to the Sunol water temple; there it mingles with the water from the Sunol gravels, collected by the Sunol filter galleries. All [11] other water-collecting agencies in the entire system, present and projected, are storage reservoirs, adapted to collect the run-off from various watersheds by dams in the streams. There are seven of these, four present and three projected. Those now built are the Merced lakes, at an elevation of 20 feet, with a storage capacity of 2,659 million gallons, situated in the city limits, about six miles from the city hall; in San Mateo County, Pilarcitos Lake, San Andreas Lake, and Crystal Springs Lake. Pilarcitos, elevation at overflow

697 feet, has, a storage capacity of 1,083 million gallons. San Andreas, elevation 446 feet, has a storage capacity of 6,230 million gallons. Crystal Springs, prior to 1911, had an elevation at overflow of 280 feet and a capacity of 18,914 million gallons. The dam was raised in 1911, and since then, the elevation has been 287.85 feet and the storage capacity 22,512 million gallons. The ultimate height of the dam, as originally designed and now projected for the future, will give an elevation for Crystal Springs Lake of 323 feet and a storage capacity of 43,000 million gallons. The total present storage capacity is therefore 29,825 million gallons on the peninsula, and 2,659 million gallons at Merced, or 32,484 million gallons. (Exhibit 12hh.) The reservoirs for the future are at the Calaveras Valley, San Antonio Valley, and the Arroyo Valle, in Alameda County. The Calaveras dam is now and for several years past has been under construction; and this reservoir, if construction is not unduly delayed by war conditions or otherwise, should deliver water to San Francisco by 1918 or 1919. The Calaveras reservoir will have an elevation at overflow of 795 feet and a storage capacity of 53,000 million gallons. It is expected that San Antonio reservoir may be built in about ten years, and Arroyo Valle at a later date. The data for these are: San Antonio, elevation 450 feet, storage 11,675 million gallons; [12] Arroyo Valle 795 feet, storage 13,800 million gallons. (Exhibit 12hh.)

Of the conduits and pumps which bring the water from the collecting sources to the distributing reservoirs in San Francisco it need only be said now that they are adequate in capacity and quality to handle the present supply. Roughly estimated, the distance from the peninsular sources is twenty miles and from the Alameda sources fifty miles. The line from Calaveras reservoir will be about 67 miles long. (Exhibit 164.)

There are in the distribution system six reservoirs, three steel tanks and two wooden tanks, having a total capacity for storage of 92.15 million gallons, or an ordinary working capacity of 79.85 million gallons. They range in elevation from 600 to 140 feet. (Exhibit 12hh.) They serve the purpose of balancing the fluctuations from hour to hour through the day, so that the peak loads can be carried, and also of furnishing a reserve in case of a bad fire, or interruption of supply by breakage of the main lines. (4277.) The hilly character of the city also calls for a large number of distinct service or distribution districts, each having its distribution reservoir.

The approximate normal yield of the system under present development is as follows: Peninsular system 20 M. G. D. (million gallons daily), Merced 3.5 M. G. D. and Alameda sources, 21 M. G. D., or say a total, approximately, of 43.5 million gallons daily. (Exhibit 12hh, Tr., 10, 183.) I have no reason to doubt the estimate for the future, contained in Exhibit 12hh, of the yield in years of extreme dryness under assumed economic development, as follows:

Peninsular system	18.5 M. G. D.
Merced, out of use.....	
Calaveras	45 " "
San Antonio and Arroyo Valle	20 " "
Sunol and Livermore gravels	26.5 " "

100 to 120 " "

[13] Coast streams—Pescadero, San Gregorio and West Union Creek	50 M. G. D. approx.
Total	160 M. G. D. approx.

Commenting on this, Hazen said (Tr., 8307):

“The uncertainty as between 100,000,000 and 120,000,000 gallons daily is due to the indeterminate character of the rights to the water by riparian owners and others; perhaps not the whole of that uncertainty, there are other causes of uncertainty—If there were no other rights existing, I think that the maximum development would be more than 130,000,000 gallons daily—With these rights taken care of, you might have 120,000,000 gallons available; I don’t think it would go down as low as 100,000,000 gallons daily.”

Speaking of the coast streams, Hazen says (Tr., 8397):

“There are something like 50,000,000 gallons per day of very excellent water that could be connected with the system and brought in that way. I think that the estimates that have been made as to that system hardly do it justice. I think it is a better source of water supply than it has been given credit of being. The company owns only very partial rights. It has bought some property and water rights, and a great deal of land, but it is only a beginning of what would be needed if it were secured. No claim is made for it in this case. The city has decided that it does not want it;—and I presume it will never be

used, but it is a promising possibility for some 50,000,000 gallons of good, and not very expensive water."

The actual average daily consumption, estimated population of San Francisco, 1907-1915, and an estimate of population and consumption 1927 by Hazen (Exhibit 164, p. 2; Exhibit 12r) is as follows:

Year	Population in thousands	Consumption	
		M. G. D.	Gallons per capita
		Actual	
1907	330	30.6	93
1908	365	32.4	89
1909	397	34.1	86
1910	417	35.6	85
1911	429	37.4	87
1912	441	39.1	89
1913	453	39.7	88
1914	477	39.4	83
1915	489	42.6	87 [Expo- sition year]
[14]	Estimated		
1916	500	43.5	87
1917	510	43.5	85
1918	520	43.5	84
1919	530	43.5	82
1920	540	43.5	81
1921	550	44.0	80
1922	560	44.8	80
1923	570	45.5	80
1924	580	46.8	81
1925	590	48.5	82
1926	600	50.0	83
1927	610	51.3	84
	Average		
1907-15	422	36.8	87
1916-27	555	45.7	82

The consumption for the future is based on the assumption that all services will be metered, which Hazen pronounces a sound business method, and one necessary to prevent waste and save expense. (8312.) The experience of Oakland, California, is valuable as to the effect of metering. Hazen says (8448):

“As a result of metering in Oakland, the company there is putting out no more water today than it did in 1905 I think, and it increased in population, increased its services, and increased its revenue on the same quantity of water.” (See, also, Hazen, 8465.)

Reference may be had to my recent report in the Contra Costa case, which showed population, 1904, 77,000; 1912, 170,000; supply 1904, 12.6 M. G. D., 1912, the same; supply per capita (**consumption** figures would vary slightly), 1904, 158.5; 1912, 74.1 gallons—this as a result of metering in 1910-12.

Mr. Hazen's estimate of growth is conservative, possibly unduly so, but is based in part on the effect of the 1906 fire, which caused an increased rate of growth in suburban communities. The estimate of Mr. Freeman (the city's adviser in the Hetch Hetchy project) was 700,000 in 1930, as against Hazen's present estimate of 640,000, and Schussler's (made before the fire changed conditions) of 800,000. If, going back to the figures of yield, we omit the coast sources and take 110,000,000 gallons daily as a reasonable figure, and 82 gallons per capita as the result of metering, there is water enough for a population of [15] 1,300,000. At 100,000,000 daily supply and 90 gallons per capita, there would be water for 1,100,000, and at 100 gallons per capita, for 1,000,000. When this population will be attained is speculative, and does not particularly concern us. It is evident that the Spring Valley sources, with considerable added expenditure, will supply the wants of the city, if waste is eliminated, for many years.

As to the design and construction of the system as a whole, Hazen says (4284) :

“The design of the structures of the company is good. I do not think I have ever examined an old system of water-works which showed such continuity of purpose as is shown by the works of this company. The design is good; the metal was well arranged in the pipes; the riveting was good; the thicknesses were closely calculated; they were strong enough to do the required work, as is demonstrated by the very small number of breaks that have occurred. The figuring was very close; the metal was stretched about as far on the lines as it was safe to go. The reservoirs and dams were well built, tight. The tunnels are of good workmanship. The distribution system is well designed and of good material and appears to be remarkably tight. The whole system reflects great

credit on those who have been responsible for its extension through a long term of years. The works were laid out with a view to future development, and the whole system has been planned so that added units could be built and worked into the system as required from time to time. The number of structures which have been discarded during the years gone by I think is low. That has been due partly to the fact that the structures have been very durable ones, and in part to the fact that the design has been carefully arranged to anticipate growth and to serve for a long period. The works are capable of long future service; they are for the most part, in very good order. The depreciation has been rather low for an old plant."

This favorable comment is a tribute to the engineering skill of Hermann Schussler, chief engineer of the company from its early beginnings until 1908, and it is refreshing to observe that the city's engineer witnesses join with Hazen in this generous praise.

At the same time, the plant is at present underbuilt and has been for the greater part of the period 1907-15 covered [16] by these suits. I quote Hazen's testimony (4278):

"Ten years ago I should say, not from personal familiarity with the property at that time, but from my study of the structures and records, that the service was thoroughly adequate in every respect. At the present time the plant is hardly up to the reasonable requirements of the service, the additions to the plant have not kept pace with the increase in business and population in the ten year period past and at the present time in my judgment the plant is underbuilt to a substantial extent; * * * the service in the last years has suffered somewhat because of that. The suffering has been partly in reduced pressures and inadequate service in certain parts of the city where the distribution pipes were not large enough to carry the water required for increasing population, and the other part of the deficiency perhaps has not been felt, but it is just as real; the supply has been maintained for the last few years because the rainfall has been abundant. If this year and last year it had been as dry as some previous years, there probably would have been an actual shortage of water; there should be more reserve capacity to provide against such contingencies, and so while that shortage has not developed due to the adequate rainfall, looking at the matter broadly, I feel that the plant has been deficient, and is deficient in that respect at the

present time. The reserve capacities I refer to are reserve capacities in storage reservoirs, with areas to fill them, and in the pipes to bring the water to the city, and all the works that are necessary to make the water available. The distribution system and pipes to the houses grow as the population grows, under normal conditions, but the supply units have to be added in large installments. It is not possible for instance to build a tenth of the Calaveras dam, and of the Calaveras pipe line in 1913 and put it in service. The only way in which additions can be made is in fairly large blocks, each of which will ordinarily serve to meet the increase in consumption through a longer or shorter term of years. In my judgment the expenditures required to bring the plant up to present needs, and to provide for growth to be reasonably and conservatively anticipated in a ten year period will require any outlay of at least \$12,000,000. * * * (4284.) I do not think that an expenditure of \$12,000,000 for further development was necessary during the years that are concerned in this litigation but a substantial amount of it ought to have been before 1913. The daily consumption of water in 1913 had reached a point where it simply was not safe to depend on the present sources and the present works to meet it. They did actually meet it, but there was not a proper margin of safety, and the city was taking a risk because of that lack of margin, that in my judgment was not warranted. In 1907 the system was pretty well built up to requirements. In [17] the natural course of events an expenditure of perhaps a million dollars a year more or less would have been made in extending the works. Actually it was not made. The falling behind was gradual. Some money was spent and some things were done temporarily not very advantageously, that increased the capacity of parts of the system, and helped. The difference between a fully adequate system, and the system as it actually was, gradually increased, until at the end of the period it was represented certainly by quite a number of millions."

I suppose there will be no dispute over the conclusion that this underbuilt condition is directly due to the many years of discord and litigation between the water company and the city. The company's position has been that it could not get money for additional capital expenditures unless the city fixed rates that would attract the capital from the private investor's pocket; that, even if capital could be had, it was unwise to extend the system in its

normal growth, while there existed the threat of active competition by a duplicate municipal waterworks, or, when the proposition took the form of a condemnation, to increase the stake at issue in a law suit. The city's position is that the rates have, in fact, been adequate; and that, in any event, the company should have fully performed its public duties, with the assurance that the courts would do justice. Whether the company or the city is right is neither here nor there. The city cannot attain its full prosperity without ample water for the present and full provision for the future. The problem is too big for pettiness; there should be an end of hostile feeling and rancorous criticism. There is room for honest differences of opinion; but these ought to be capable of settlement by exhaustive inquiry into the facts and by fair and logical reasoning to a conclusion. We have had a full inquiry; and I appreciate the responsibility resting on me to draw just conclusions. It is to be hoped that the whole matter may be settled. [18] The quality of the water is good. The only criticism made is of the Merced water, and that may be characterized as fair; it will be spoken of hereafter. Some of the water in the system is softer, and some harder; it is as soft as can be supplied from the characteristic rocks and soils of this vicinity. It is well protected from pollution, and the supply is an unusually good one in that respect. (Hazen, 4276.) A considerable part of the value of the company's property and of the consequent cost of water-service, is in the extensive areas of watershed lands whose chief purpose is to prevent the encroachment of human habitation upon the supply areas. Hazen says further (4276-7):

“There is a little trouble at times from the growth of certain organisms in the open reservoirs, which get into the distribution system and have caused at times in the past a little annoyance; that is a secondary matter, and the company has done all that it could be expected to do in taking care of these matters up to the present time. Taking it right through, the quality of the water is very good. The requirement of long storage in the distribution reservoirs plays a part in the presence of the organisms. The very long storage, of course, is in the impounding reservoirs away from the city.”

It is to be pointed out in passing that when, in the future, water may be brought from the Sierras or the great rivers of the interior, it will be of the same character as the present supply, except for possible variation in the direction of greater softness;

the increase of organic content by reason of necessary storage is an inevitable characteristic of any supply to San Francisco.

The showing as to deaths by typhoid is evidence of the good character of San Francisco's water supply. Exhibit 12q, containing vital statistics, shows deaths from typhoid, per 100,000 population (Spring Valley estimates) in the early years from 1866 to 1880, varying from 36.6 to 91.9; a gradual lowering of the rate down to the time of the fire in 1906, and in 1906-07, [19] due to the lack of sanitary precaution after the fire, and to a sharp drop in total population, a pronounced increase to a rate of 69. In the years concerned in this litigation, the typhoid death rate, per 100,000, was as follows:

1907-08.....	29.3
1908-09.....	17.1
1909-10.....	15.3
1910-11.....	16.0
1911-12.....	13.3
1912-13.....	16.1
1913-14.....	12.2

This general survey of the water system as a whole may be fitly completed by reference to certain facts that operate to increase the cost of water service in San Francisco and the vicinity as compared with large centers of population elsewhere. One factor of increase has been referred to; the fact that the supply here comes chiefly from small surface streams, rather than lakes, wells, or rivers, and consequently needs large areas of protective watershed, to be kept free of habitation. This is peculiarly characteristic of the Pacific coast. (Hazen, 8349.) I quote Hazen further (8417):

"My conclusion as a result of this whole study is that the conditions of the water service in San Francisco are very difficult. I think that with respect to physical conditions San Francisco is probably the hardest city to supply with water in the United States. The service is necessarily more expensive than it is in other cities * * * (8419) From the standpoint of amount of collections per capita, or per million gallons, the cost of the water service in San Francisco, without attempting to give you a precise figure, is something like double what it is in the Mississippi Valley and east thereof in this country * * * (8422). The whole condition as between here and the Mississippi Valley, or east thereof, is different. I don't think the

rates in the East have any bearing on the rates here. There is a whole series of conditions that tend to make the rates higher here. In the first place, the materials cost more. There is a differential on freight rates that perhaps averages \$10 per ton. That affects all the supplies that come from the East, and that is a large part of the whole, although not all of it. The labor cost has been somewhat [20] higher, and that adds to the cost of construction and to the cost of operation. The rainfall is less, and it is very much less regular. So that the amount of water that has to be stored to maintain the service supply through a term of years is very much greater, I suppose six times as great, relatively, as it is on the Atlantic slope. That, of course, means more money. Then there are the peculiarities of topography, San Francisco being built on the end of a peninsula. That situation is perhaps unique. New York, by the way, is at the end of a peninsula, but a large part, perhaps 40 per cent of the New York supply comes in from the Long Island sources. It is as if the Golden Gate were shallow and easily crossed, and as if Marin County contributed a large amount of cheap water. Then again, San Francisco is a very hilly city; that means increased expense for high service systems and for pumping and operation. The cost of the service is substantially greater in San Francisco than it would be if it were flatter and not so high. A good deal more water is delivered at the Honda level than at the lower levels, and that is some 370 feet above tide, whereas many of the Eastern cities are supplied with water at not more than 130 to 170 feet above tide, or above the river levels opposite * * * (4295). The sources of supply for San Francisco are rather remote; only a few American cities have gone as far for water." (And see Hazen, 4294, 4295.)

With this general introduction, we are in a position to attack the problem in hand. And first it is necessary to consider the principles of law (and of the underlying economics) which are applicable to rate fixing controversies in general and to valuations of public utility properties in particular.

Fundamental Principles of Law.

The first principle to be observed is that the validity of the state's rate-fixing legislation is to be given the benefit of a strong presumption in its favor. Thus stated, this principle is not merely

the familiar rule of all civil actions that the plaintiff must prove his case by a preponderance of evidence; it resembles rather the rule by which a court is guided in reviewing the action of a subordinate tribunal to whom the primary determination of facts is committed. Its [21] underlying justification, however, is even deeper, for it rests upon the respect which, in our constitutional system, must be observed by the courts toward the determinations of the co-ordinate legislative department.

And yet, while thus stating and endeavoring always to bear in mind this presumption in favor of the defendant, I must confess, in the interests of intellectual candor, that it is often difficult to find play for its practical application at a definite point in the reasoning. I should say that it has most often been applied by the Supreme Court where the results of the rate-ordinance are in doubt; but here, as necessarily in an unmetered system, where lowered price has no effect to increase consumption and returns, the actual results of the ordinances can be estimated and have been stipulated. In these cases, it is contended by the city and laid down by the decisions (e. g., *Spring Valley Waterworks vs. San Francisco*, 192 Fed. 145), that this is an original proceeding, an independent investigation, not a review of the proceedings or findings of the legislative body. The master's investigation and conclusions proceed by successive steps; obviously, it is difficult to apply a presumption in favor of the ordinances, when nothing is known of the Supervisors' findings, either as to value of properties, or proper rate of return. And when it is considered that the master's valuation and other findings are largely in the nature of mathematical processes, it is hard to see any room for any divergent result. In the matter of rate of return for example, the evidence may show clearly that seven per cent is proper; the Supervisors may have intended to allow six or eight per cent, could we know their intentions; the proofs may show that the actual return resulting from the ordinance was five per cent. Where is there any room [22] here for presuming in favor of the legislation? My conclusion is that we must require clear proof of the plaintiff's case, and rest satisfied with that statement of the principle.

Proceeding now, after this statement of the primary warning to caution, we may state the cardinal principles underlying this class of cases by reference to the *Minnesota Rate Cases*, 230 U. S. 352, 433. Mr. Justice Hughes spoke for the court as follows:

“The inquiry is whether the state has overstepped the constitutional limit by making the rates so unreasonably low that the carriers are deprived of their property without due process of law, and denied the equal protection of the laws.

“The property of the railroad corporation has been devoted to a public use. There is always the obligation springing from the nature of the business in which it is engaged—which private exigency may not be permitted to ignore—that there shall not be an exorbitant charge for the service rendered. But the state has not seen fit to undertake the service itself; and the private property embarked in it is not placed at the mercy of legislative caprice. It rests secure under the constitutional protection which extends not merely to the title, but to the right to receive just compensation for the service given to the public. (Citations.)

“In determining whether that right has been denied, each case must rest upon its special facts. But the general principles which are applicable in a case of this character have been set forth in the decisions.

“(1) The basis of calculation is the ‘fair value of the property’ used for the convenience of the public. *Smyth vs. Ames*, 169 U. S. 456. Or, as it was put in *San Diego Land and Town Co. vs. National City*, 174 U. S. 757: ‘What the company is entitled to demand, in order that it may have just compensation, is a fair return upon the reasonable value of the property at the time it is being used for the public.’ See, also, *San Diego Land and Town Co. v. Jasper*, 189 U. S. 439; *Willcox v. Consolidated Gas Co.*, 212 U. S. 19, 41.

“(2) The ascertainment of that value is not controlled by artificial rules. It is not a matter of formulas, but there must be a reasonable judgment, having its basis in a proper consideration of all relevant facts. The scope of the inquiry was thus broadly described in *Smyth vs. Ames* (169 U. S., pp. 546, 547): ‘In order to ascertain that value, the original cost of construction, the amount [23] expended in permanent improvements, the amount and market value of its bonds and stock, the present, as compared with the original, cost of construction, the probable earning capacity of the property under particular rates prescribed by statute, and the sum required to meet operating expenses, are all matters for consideration, and are to be given such weight as may be just and right in each

case. We do not say that there may not be other matters to be regarded in estimating the value of the property. What the company is entitled to ask is a fair return upon the value of that which it employs for the public convenience. On the other hand, what the public is entitled to demand is that no more be exacted from it for the use of a public highway than the services rendered by it are reasonably worth.' "

The Smyth-Ames case must not be understood as laying down a definite rule for determining present value, or as authorizing the use of any one of the criteria named as sole guides. It enjoins a broad treatment of the difficult question of present value. It identifies present value neither with original cost, market value of securities, nor present cost of reproducing the plant, for these, generally, are divergent. It means simply that in any reasoning process aimed at determining value, these, or other reasonable bases, shall be considered as aids to judgment if and where justly applicable in the particular case.

Value is worth, in terms of money. There are obvious difficulties in determining the value of a waterworks that do not exist in an appraisal of private property. The test of market value is absent, in application to the works as a whole or to many of its units; waterworks are not commonly bought and sold. The test of earning power is impossible where the rates are the ultimate matter in question. But nevertheless, the implications of the word value are the same where applied to the property of a public utility as when applied to the [24] property of an individual. Value, fair or reasonable value, value for rate-fixing purposes, value in exchange or in condemnation, are, *in the normal case*, synonymous terms. Only confusion has resulted from the attempt to multiply distinctions. The public authorities, for example, could not justly or logically fix a value in condemnation, and thereafter find a lesser value upon which to base rates.

Original cost is urged as a criterion of value by certain economists and state officials. The theory is that the return in money, which is the inducement and the reward for serving the community with water or gas or other service, is justly to be determined on the basis of the amount of sacrifice on the part of the investor; and this amount of sacrifice is summarily identified with the original investment in existing property. The assumption neglects to take account of the fact that there would ordinarily be

successive owners of the property or of shares in it, and at different purchase prices. Furthermore, the test proposed applies to property devoted to the public use the socialistic basis for fixing value, while the property of all other persons in the community is valued in accordance with the non-socialistic basis of our economic structure without reference to its cost. Money, the measure of value, changes in purchasing power in obedience to economic laws.

The cost theory was disapproved in *Willcox v. Consolidated Gas Co.*, 212 U. S. 19, 52, and distinctly repudiated in the *Minnesota Rate Cases*, 230 U. S. 352, where Justice Hughes said (454):

“It is clear that in ascertaining the present value we are not limited to the consideration of the amount of the actual investment. If that has been reckless or improvident, losses may be sustained which the community does not underwrite. As the company may not be protected in its actual investment, if the value of its property be plainly less, [25] so the making of a just return for the use of the property involves the recognition of its fair value, if it be more than its cost. The property is held in private ownership, and it is that property, and not the original cost of it, of which the owner may not be deprived without due process of law.”

Original cost is, of course, a test of controlling importance in the case of newly constructed or acquired property; it may be a valuable check upon the value of property of moderate age; but generally it will have no significance as regards property, say of forty or fifty years' elapsed life.

I have referred to the identity of meaning among the terms value, value for rate-fixing, value in exchange, and so on, as true in the normal case. The distinction between the normal plant and the abnormal plant, borrowing these terms from the science of economics, is a very useful one in any thinking we have to do in this matter of valuation. I mean by a normal plant one prudently and economically built, with a demand for its product that justifies its existence. In such case, the community must pay its costs of production and a reasonable additional profit to its owner. But an extravagantly built plant, or a plant that the community does not need, is abnormal. Its *value* for all purposes may be the same; but it will not be worth its cost, original or reproductive. The point is worth remembering, in view of the fact that we usually reason from cost to value. But further, we may meet a case of

abnormality where value for rate-fixing diverges from value in exchange. There is an instance in this case—the Merced source of supply. Assuming that all the surrounding lands are useful and to be considered in the basis upon which a return is to be given, the value of the lands for residence purposes has increased to such an extent that its [26] sale value is, let us say with Hazen, \$6,925,000. (Exhibit 164.) But while at this time the supply is indispensable, it would be too expensive on such a capital value, and is to be abandoned in a few years in favor of the Calaveras supply (except as to part of it, for emergency purposes). Hazen therefore determines that its value for rate-fixing is \$4,362,000. Obviously, with this prospect of early realization of its sale value, it would not now be sold or condemned at the lower figure.

I think it is with regard to such departures from the normal that we shall usually find application for the Supreme Court's statements that "each case must rest upon its special facts" and that the charge to the public must be no greater than the service is reasonably worth, and the like.

With this preliminary discussion, we are prepared to begin our investigation. As stated, the suit concerning the rates of 1913-14 has, by agreement of the parties, been made the main case, and adjustments will be made from that as a base to cover the other years—in itself no light task. We have, then, to determine the value of the plaintiff's property on December 31, 1913; then its revenue under the ordinances, if they had been enforced, happily an agreed amount; its proper operating charges, a matter of much conflict; and finally the sufficiency within constitutional guarantees of the net revenue thus indicated.

To get a preliminary idea of the extent of the controversy on the matter of value of the property, I state the sums used as rating bases by the leading witnesses:

Metcalf, for plaintiff, \$43,600,000. (Exhibit 201.)

Hazen, for plaintiff, \$40,000,000. (Exhibit 164.)

Dillman, for defendant, \$22,000,000. (Exhibit 212.)

[27] This very large difference does not depend entirely upon difference in appraisals of the same items of property; the city makes radical exclusions of property from the total entitled to a return, on the ground of lack of usefulness in the service of water.

I consider first the lands of the company; and will here value all lands claimed by the company to be entitled to consideration, leaving questions of exclusion to the final summing-up.

LANDS

I have adopted as my guide in determining the value of the plaintiff's lands the rule in the *Minnesota Rate Cases*, 230 U. S. 352, at 455, where Justice Hughes announced as a measure, "the fair average of the normal market value of land in the vicinity having a similar character." The court refused to sanction the addition to value thus determined, of a final percentage to cover expense of acquisition. It is of course arguable, that the court was in this regard speaking of a base value improperly determined, the amount of true market value not being shown; and it is evident, that if the railroad had been newly completed, the best test of value would have been cost, which would have included engineering, legal and administrative expense and a sum for interest upon amounts paid. But the language is general and unqualified and should be followed until the Supreme Court declares that reasonable overhead allowance may be added when the base value is determined according to its rule quoted.

The witnesses have all followed this rule; and in so doing, have apparently, as a result of that rule, assumed that the company could buy or could sell the lands appraised, at the figures named by them. Usually, however, they assumed [28] that the lands would be split up and sold at the prices given, and with this idea of hypothetical sale in mind, there naturally entered into their estimates the notion that the sale, especially in order to be effected in the year to which the valuation applied, would have to be on a wholesale basis. The market would thereby be limited, and the prices necessarily reduced. I have myself, in the tentative appraisalment I made of this property as soon as the evidence on this subject was completed, had this idea in mind and fixed values accordingly. In reviewing my first figures thus reached, I have made no change on the theory that this was an erroneous view. And yet, I believe upon reflection that it was; the hypothetical sale is as fanciful as the hypothetical re-acquisition condemned by Justice Hughes. The rule of the Minnesota case is not a logical formula; it is, in a measure, a rule-of-thumb to reach just results on broad grounds, and should be applied with equal force whether the lands valued are of large or small extent.

All the witnesses have endeavored to determine "the fair market value for all available uses and purposes." *Minnesota Rate Case, supra*, p. 451. All these lands are used for waterworks purposes. Reservoir lands will be given special discussion later.

As to the watershed lands, both parties and their witnesses assume that the value, used as they are, is that which they otherwise would have for residence, country estates, farms or cattle ranges, as the case may be. Occasionally the situation seems curious; as for example, when certain gravel lands on the Sunol filter beds were appraised. They are of importance in the system, because the gravel both stores the water and filters it; their value as pasture is not great and the winter floods would wash away the fences. But all witnesses (and the master) have fixed a value for pasturage and for the gravel which can be dug out of it and sold.

[29] It would not be possible to initially value tracts of thousands of acres as a whole or at a unit price per acre. The land must be divided into parcels of smaller size, and graded according to characteristics. As a practical guide, all the witnesses have therefore taken as a guide the parcels as they were acquired by the company, as shown in a book of maps (Exhibit 8); and these units in turn have often been graded to reach a unit value per acre for the parcel. Nothing has been added by me for additional value of the unified holdings; this seems to be the spirit of the rule in the Minnesota case. (But compare *New York v. Sage*, 239 U. S. 57, which seems to recognize the greater value due to unification.)

There was a thorough presentation of the evidence as to land values. After finishing the evidence on both sides as to a body of lands—the Merced lands, the peninsular lands, and the lands in Alameda and Santa Clara counties, the master, counsel, and witnesses to point out the boundaries, visited the property under appraisal and also lands cited as the subjects of comparable sales. The trips were taken by automobile, on horseback and on foot; probably every important tract was traversed and nearly every acre at least viewed. I have considered the evidence in the record, both regarding these lands and other lands deemed to be instances of comparative sales, the qualifications, personality and bearing of the witnesses on the stand, and the evidence afforded by the inspections of the property. In my appraisal I have doubtless erred here and there as to the value of individual parcels; but the value of the lands as a whole, should be correct and just to both sides.

[30]

San Francisco Lands

The parties have agreed that the company's lands in San Francisco, other than the Merced lands, were on December 31, 1913, worth \$1,166,685.10 (Baldwin, Exhibit 13, 10830), and I so find.

The detail will be found in Exhibit 13. By stipulation (6292), the same value obtained during all the period in controversy.

Merced Lands

The Merced rancho contains 2835.76 acres, composed of 336 acres in the lakes, 17.05 acres in the right of way of the Ocean Shore Railroad, 2482.71 acres in watershed. It lies in the southwestern corner of the city and county of San Francisco, extending into San Mateo County on the south. It is separated from the thickly populated parts of the city by the range of hills dominated by the Twin Peaks, about 900 feet high, and is distant from $4\frac{1}{2}$ to 7 miles from the Civic Center. The city is now constructing a tunnel under these hills which will bring the nearer portions of this property within twenty minutes ride of the business center. Prior to 1911, the only adjacent residential development was east of the southern half of the Merced tract, several subdivisions of low-priced property, with scattered dwellings of a cheap class. About 1911, there began a series of residential subdivisions, north-east of this tract and adjacent to it, of high type, characterized by fine landscape architecture and protected by restrictive covenants suitable to residences of the best kind. There ensued a quick rise in values. The Merced tract commands beautiful views of the ocean, the lakes and the easterly hills; its topography lends itself readily to economical subdivision; and though exposed to the westerly winds and fogs, it is no different in that respect from the high-priced residence lands along the Golden Gate.

[31] I reserve consideration of the lake areas until later. The railway easement has been eliminated from the appraisal.

The remaining area, 2482.71 acres, has been valued by A. S. Baldwin and Duncan McDuffie, witnesses called for the company, and by Philip Paschel and O. B. Martin, called for the city, as follows:

Baldwin	\$6,718.250
McDuffie	6,454,759
Paschel	5,089,583
Martin	5,026,850

All of these appraisers are entirely competent and impressed me as fair and straightforward. Mr. Baldwin and Mr. Paschel

are both of the real-estate firm of Baldwin and Howell. The fact that they agreed on the values of the other city lands, referred to in the last title, and here disagreed to the extent of over a million and a half dollars, emphasizes the uncertainty which must exist as to value, where property is affected by speculative possibilities of a new development and a new movement upward in prices. Baldwin and McDuffie have been and are concerned, as owners and agents, with the subdivisions to the northeast. The experience of Martin and Paschel has been chiefly in down-town real estate. It is urged that the plaintiff's witnesses have therefore a peculiar fitness by reason of experience; and, per contra, that their financial interests in the near-by properties has unconsciously produced an unwarranted optimism of view. Martin and Paschel impressed me favorably as men of sober and conservative judgment; furthermore, the burden of proof is strongly on the plaintiff. I have given some weight and effect to the appraisals of the company's witnesses, but I find my judgment accords most nearly with the views of Paschel [32] and Martin. It is to be remarked that error at this point is of less consequence; both parties agree that, even if all these properties are included as in use, they must be valued, for rate-fixing purposes, at less than the lowest appraisal given. This is discussed in the sequel. The value I find may be called a sale value.

I give no weight to testimony of these witnesses as to the value of the lakes from a real estate point of view, that is, for recreation and the like, as appurtenant to the watershed lands. This seems rather speculative and doubtful. They are likely always to be devoted to waterworks uses of some kind. I include in my findings as to value of the watershed any accretion in value by reason of the presence of the lakes in the landscape.

Neither do I think a rule for valuation of these lands must assume a sale for immediate cash. Mr. Martin says he would reduce his appraisal 20% if the property were to be sold on such terms. Such large transactions are usually made on time.

In reaching the total value I have found it convenient to follow the gradings or subdivisions used by Messrs. McDuffie and Martin. (See map, exhibit 45.) My detailed appraisal corresponding to this map is annexed as Appendix 1. It was stipulated (8248) that the value found for December 31, 1913, should apply for 1914-15, 1913-14 and for 1912-13; 90% thereof for 1911-12; 85% for 1910-1; and 75% thereof for the other periods concerned.

Accordingly I find that the value of the Merced watershed lands of plaintiff, 2482.71 acres, was as follows:

1914-15}	
1913-14}{.....	\$5,532,231.50
1912-13}	
1911-12.....	4,979,008.35
1910-11.....	4,702,396.35
1909-10}	
1908-09}{.....	4,149,173.25
1907-08}	

[33]

Peninsular Lands

Under this title I group all lands in San Mateo County claimed to be in use, other than those included in the Merced property, in reservoirs, or, with some exceptions, in rights of way. The bulk of the acreage is the protective watershed of the three great reservoirs, Crystal Springs, San Andreas, and Pilarcitos.

The property was appraised by A. S. Baldwin and W. R. Hoag for plaintiff, and Norwood B. Smith for defendant. The company owns 21,962.97 acres, which was appraised as follows:

Baldwin	\$2,869,213.40	(Exhibit 18)
Hoag	2,801,940.30	(Exhibit 25)
Smith	1,605,013.86	(Exhibit 47)

Mr. Rodgers, manager of the Mills and Easton estates, adjoining land-owners, appraised certain lands east of the lakes at figures higher than Baldwin and Hoag. Mr. Oliver appraised the same lands at figures lower than Smith; but he also testified that all market values on the peninsula were too high. Other witnesses spoke as to particular parcels.

The three principal witnesses, Baldwin, Hoag and Smith, agreed that the most available use to which this land could be put, other than waterworks uses, was for country estates. The natural beauty of San Mateo County has from early times attracted wealthy people. The first fine homes were near the railroad; later as the towns grew the large country places were established further west in the slopes of the first range of hills. After the fire of 1906, not only did these towns receive a large permanent accession of population from San Francisco's people, which tended to push the wealthy class further to the west, but there also came many more people of means to increase the demand for large country places—"country estates", as the real estate [34] dealers love to call them. This

demand seemed to have been especially active from 1910 to 1915. So that in December, 1913, the water company's land along the San Andreas and Crystal Springs lakes to the east and south was bordered with lands used for country estates whose value was measured in terms of hundreds and even thousands of dollars per acre. There existed a demand for large acreages, and for wild land, useful only for its scenic beauty. Thus a precipitous hillside, a thousand feet high, covered with thick brush and trees, adjoining habitable acreage south of Woodside, sold for \$60 an acre.

The Spring Valley lands are well adapted to satisfy this demand for large country places. They lie between the Buri-Buri Ridge and its southerly extension, the Pulgas Ridge, on the east and the Montara mountains on the west, the trend of these hills being northwest and southeast. Two intermediate and parallel ridges divide the property in its north half. The easterly slopes of these hills are thickly covered with shrubbery and trees, those facing westerly being more open in the way characteristic of California hills. Deer, quail and wild life abound by reason of the company's protection. The climate is that of the peninsula generally; the northerly portion, however, being rather disagreeably exposed to the summer trade winds and fogs. The lakes themselves are a large element in the beauty of the landscape. The entire tract is strikingly reminiscent of the Scotch lakes.

It is not easy to value such property, and the wide diversity in the appraisals challenges careful consideration. I have weighed the estimates in connection with many things: the reasons therefor given by the witnesses; the experience of the appraisers and their bearing on the stand; the evidence [35] afforded by sales in the neighborhood. I have had occasion to reason from valuations of items where the appraisers were in harmony to the proper valuation in cases where they were wide apart. I have considered the consistency of each appraisal within itself. It would have been impossible for me to appreciate the problems presented without the evidence afforded by the several days of inspection of these lands and of the near-by lands, offered as comparable sales. This done, I tried to put myself in the position of one of a syndicate of purchasers of the whole tract (other than the lakes) buying on a wholesale basis, and made a tentative appraisal while the evidence was fresh in my mind. This appraisal I have gone over in the light of the arguments and a renewed consideration of the evidence; my final revision is annexed as Appendix 2. Since the

property had to be graded according to its diverse characteristics, the witnesses and the master followed the plan of valuing it by subdivisions as it was acquired, so that the total valuation is the sum of the subdivisional values. This is not entirely logical, since it would not be thus sold on the assumed re-sale, but it was unavoidable; but throughout I have had in mind, so far as possible, the relation of the parts to each other, and the fact that the value was to be found for large acreage—a depressing influence.

A word should be said of the witnesses. Messrs. Baldwin and Hoag are men of long experience in handling real estate both in San Mateo County and elsewhere, and their evidence shows the ripening effect of that experience. The city's witness, Mr. Smith, is a much younger man, and his experience in a position of independent business responsibility began in 1911 when he entered the real estate business in Palo Alto. His appraisal was made in 1914, and his testimony in 1915. During [36] that short period, however, he met with striking success, and was a broker in sales of the so-called "country estate" property, in the region southerly of the lakes, of a volume exceeding the sales of other witnesses. His appraisal has been made with painstaking care, but the result lacks balance. To him the country estate is entirely *sui generis*, a landscape to be appraised only by an artist in that field, as a painting must be appraised by a connoisseur. Such appraisal in his view can be performed with the accuracy of a laboratory experiment. In his maps of gradations of various parcels (Exh. 49) will be seen appraisals of meticulous exactness; for example, in parcel 90, a tract of 856 acres, there may be found a piece of 80 acres appraised at \$111.47 an acre, or a total of \$8918.03. Cross-examination by counsel and the master failed to discover by what mental process numerous results like this were reached. With this point of view, it was natural he should conclude that "I don't think there is anyone who knows as much about what that land is worth as I do," (3833) though he concedes that others could, with study and time, arrive at fairly accurate figures. I mention these idiosyncracies in no unkind spirit; his evidence has been helpful to me; but to illustrate that his appraisal lacks something of balance, which a riper experience will undoubtedly give. In his painstaking care for minute details and appraisals to the cent, he has often lost the perspective which a broader view would have attained. For example, parcel 122, an unattractive piece of land on the far side of Crystal Springs lake, is appraised by him at \$73 an acre (Baldwin

and Hoag, each \$75); while the Burke place on the eastern shore, in my eyes of exquisite beauty, (parcel 164), was given a value of only \$77, (Baldwin, \$175; Hoag, \$225). In general it seemed to me [37] that Mr. Smith was relatively too high on the less desirable lands in the northwesterly portion of the property and too low on the finer land in the southerly end.

Cost figures, where the acquisition was recent, have been closely considered. They have not always been helpful. There are cases, both on the peninsula and across the bay, where they are out of harmony with the other evidence; sometimes they cost beyond their value, at other times they were bargains.

Both sides seem to have had difficulty in handling the question of lake view. The real estate men have generally disclaimed ability to appraise the value of the reservoir lands, since sales of such lands do not commonly occur; and in that connection have apparently assumed that an addition to the value of watershed lands because of the view they might have of the lakes, would to that extent involve an appraisalment of the reservoir areas. Accordingly, Baldwin and Hoag state that they do not consider the lake views in their appraisalment—that their figures are for the watershed, as if the lakes were not present. Smith says that the entire values of the lake areas are reflected into his appraisalment of the watershed. It would follow that if the watershed could be sold off, say at Mr. Smith's figures, and full protection to the water secured by improved methods of filtration, the reservoirs, though fulfilling their functions as at present, would be worth nothing. This is, of course, absurd. Additions to the value of a piece of property by reason of desirable improvements of neighboring land, do not connote a corresponding loss in value of that land. Suppose I buy a corner lot and the lot adjoining and a neighbor buys the next lot. He builds a home on his lot and I build on the corner, and devote my intervening lot to a beautiful garden. The assurance [38] of light and air and the pleasing prospect would increase the value of my neighbor's property, perhaps \$500; presumably it would increase the value of my corner by a like amount. It does not follow that my garden lot is worth \$500, or twice \$500, or any sum less than it was before. The analogy seems exact. I take the Baldwin and Hoag figures as inclusive of lake view, despite their testimony to the contrary. I suppose it is not logically impossible to place values without accounting the influence of the lakes; but it seems unlikely that they could always keep this unreal assumption in mind while

they were appraising the property. At any rate, their figures seem high enough for the property with the lake view included. I have found my values for the watershed inclusive of the additional value afforded by the presence of the lakes in the landscape.

It should be noted in passing that the utility of these watershed lands, lies not only in their protective capacity; forestation and the increase of natural growth over wide areas causes increased condensation of atmospheric water and a more gradual run-off.

I find that the value of the peninsular watershed lands, 21,962.97 acres, specified in Appendix 2, was on December 31, 1913, the sum of \$2,264,143.00, an average value per acre of \$103.08. The fact that this is approximately an average of plaintiff's and defendant's figures is accidental, but rather interesting. Following the stipulation of the parties (1187) for adjustment of values to the different years, and eliminating parcels not owned in any year (8661, 8787, 8933), I find the following values for the years named:

1914-15,	\$2,264,143	
1913-14,	2,264.143	
1912-13,	2,264,143	
1911-12, 95%,	2,149,964	(deduct parcel 212)
1910-11, 90%,	1,965,339	(deduct 212, 211, 210, 208)
1909-10, 85%,	1,817,072	(deduct above and 205, 203, 202, 199)
1908-09, 85%,	1,681,483	(deduct above and 196, 195, 194)
1907-08, 85%,	1,643,301	(deduct above and 191)

[39] In Appendix 2 b, I have collected various properties in San Mateo county appraised by Baldwin, Hoag and Smith, not in the watersheds of the great reservoirs. I have omitted certain smaller pieces appraised by them; some are not in use, others will be appraised in connection with rights of way. Like the foregoing appraisals, this is subject to deduction of items not in use, a matter to be considered later. I include in this list the Ocean View pump lot, Millbrae pump lot, Millbrae reservoir lot, Silva tract, Belmont pump lot, Belmont Reservoir lot, Ravenswood and Frisbie lands and the San Mateo screen tank lot. I find that the value of this property on December 31, 1913, was \$344,921.

Adjusting for the various years, the values were:

1914-15	}	\$344,921	
1913-14			
1912-13			
1911-12	95%	327,675	
1910-11	90%	310,429	
1909-10	85%	297,583	
1908-09	85%	221,579	(deduct parcel 193)
1907-08	85%	221,579	(ditto)

Alameda and Santa Clara Lands

These are all in Alameda county excepting the southern portion of Calaveras valley, which lies in Santa Clara county. They may be grouped as the Arroyo Valle lands, Pleasanton lands, Sunol lands, San Antonio lands, Upper Alameda lands, Calaveras lands and Niles Canyon lands. The Arroyo Valle is a wild canyon with high, steep walls, opening into the Livermore valley southeast of Livermore. The lands around Pleasanton, at the lower end of the Livermore valley, are rich farm lands. Around Sunol, they are farming and pasture lands. San Antonio Valley is a shallow depression in the hills opening into the Sunol Valley. Calaveras is a remarkable valley draining [40] to Sunol. On the west it is separated from the Santa Clara Valley by the high Mission peak range and on the east by even higher hills forming the Oak Ridge, the two ranges coming approximately together at the ends. There is thus formed a perfect reservoir site, hidden in the hills, about four miles long and a mile wide. The bottom is good farming and orchard land, the west side agricultural and pasture land, the east side pasture lands.

The principal witnesses for the water company were C. A. Gale, appraising all the lands, and C. H. Schween and W. S. Clayton, each appraising portions; for the city, M. G. Callaghan and I. S. Parsons. Gale has had the greater experience, but all were competent. The lands were appraised without reference to their availability or utility for water supply; all witnesses found their value for farming or pasturage. For convenience, the appraisal has been of separate tracts, following the form of original acquisition.

It should be said that here as at Lake Merced, farming and range lands are used for these purposes, as well as for water supply purposes. The income and expense are carried into the general accounts. It would not be fair to the company to use the net revenue from these rents as an index to the value of the lands for

reasons Mr. Eastman points out. (10943 *seq.*) The leases are for short terms, improvement, habitation, and pasturage are variously restricted, and cancellation on short notice is provided for. Thus, the relation of these lands to water supply, and the existence of proceedings in condemnation, result in low rentals.

I have given such influence to cost figures, especially in recent years, as I could. One must consider the question of [41] improvements as influencing price, the extent of forced over-payment, the question of duplication in the figures for water-rights, hereafter accounted. Sometimes the cost-figures were bargains. All the witnesses had the same difficulty.

The appraisals of the three witnesses valuing the entire property included in this title will give an idea of the problem before us:

Gale (for plaintiff).....	\$3,843,853.53 (Exhibit 28)
Callaghan (for city).....	2,693,232.69 (Exhibit 42)
Parsons “ “	2,719,892.74 (Exhibit 44)

My findings in detail will be found in Appendix 3 of this report. I find that the value of the lands of plaintiff therein specified was, on December 31, 1913, the sum of \$3,296,932.

This result, as in my valuation of the peninsular lands approaches an average of the estimates of the parties. It was again purely accidental, as a study of the detail of Appendix 3 will show. Where the appraisers are competent as here, and the items in dispute are very numerous, it would seem from this that the *judicium rusticum*, the taking of the average, would not be far wrong. It is interesting to me as some evidence of the fairness of my results.

It will not be out of place to make comparison with Judge Farrington's results in the 1903 case. (*Spring Valley Waterworks v. San Francisco*, 192 Fed. 161.) Upon the evidence before the court then, 40,379.52 acres of watershed lands, 16,979.94 acres on the peninsula and 23,399.58 acres in the Alameda system, were valued at \$100 per acre. The average value per acre found here for 71,000.3123 acres owned in 1913, 49,037.3423 acres in the Alameda system and 21,962.97 acres on [42] the peninsula, is \$78.32 per acre. This is striking when we consider that market values have advanced in the ten year interval, especially so in San Mateo County, and that the additional acreage acquired has included much land worth several hundred dollars per acre. I surmise that the difference here may be due to the application of Justice Hughes' rule in the Minnesota Rate case, announced after the former deci-

sion of this court; or, and perhaps also, because of a better presentation of the evidence by the city.

By stipulation (6291, 6292), the value thus found for December 31, 1913, of this group of lands, is the same for each year of the period 1907-15, concerned in these eight suits. Deduction must be made, however, of lands not owned in any fiscal year prior to the date named. The question of exclusion of any of these lands from the capital basis of return because of lack of utility or otherwise, will, as stated before, be considered in the sequel.

The result for the different year is:

1914-15,	\$3,296,932	
1913-14,	3,296,932	
1912-13,	3,296,932	
1911-12,	3,175,349	(deducting \$121,583 value purchases in 1912)
1910-11,	1,606,802	(deducting \$1,568,547 value purchases in 1911)
1909-10,	1,596,627	(deducting \$10,175 value purchases in 1910)
1908-09,	1,588,680	(deducting \$7,947 value purchases in 1909)
1907-08,	1,588,680	

Rights of Way

The plaintiff's rights of way were valued by F. A. Radle (Exhibit 122), for plaintiff, and Charles S. McDonald (Exhibit 169), for defendant. Messrs. Baldwin, Hoag and Smith also gave evidence [43] as to particular parcels. Metcalf, for plaintiff (Exhibit 199) and Dillman, for the city (Exhibit 213) revised the respective appraisals, partly in the way of conceding errors, and partly by omitting properties not in use or elsewhere appraised.

The appraisals by Radle and McDonald were in great detail. It will serve no useful purpose to enter into similar detail here. Furthermore I will depart here from my prior practice of valuing the entire subject-matter, without reference to its being used or useful; here I shall find the value on December 31, 1913, of rights of way used and useful, not elsewhere accounted for.

The appraisements are:

Radle	\$975,558
McDonald	272,730

A difference of \$700,000 seems formidable. It rests, however, almost entirely on the determination of legal principles of valuation in particular instances. A table in Mr. Searls' argument (p. 1831), shows that \$606,000 of this difference arises where the pipe-lines traverse the cemeteries south of the city of San Francisco, \$38,000 where easements formerly in private property are now in public streets, \$17,500 where, no width being specified, the appraisers have used different widths, and \$44,000 on the balance of the lines.

Plaintiff's position as to the lines through the cemeteries is, that following the standard of the Minnesota Rate case, "the fair average of the normal market value of land in the vicinity having a similar character," a right of way through a cemetery is to be valued at burial lot prices, viz., \$1.00 to \$1.50 a square foot. I see no merit in this literal application of the [44] Minnesota rule. Such a comparative standard would refer to retail transactions of a highly special and expensive type. No water company would be justified in paying such prices, nor would it do so, where, as here, it was possible to make a detour in the pipe-line. I have considered Mr. Baldwin's figure of \$10,000 an acre and also the figures of actual costs in 1907, just before the cemeteries were established. I have adopted \$5,000 and \$5,500 as values per acre through the cemeteries. I have allowed nothing for the easement through Mt. Olivet cemetery, which is apparently a street. Whatever doubt there is as to the fact I resolve against the plaintiff, as the record is not clear.

Where the right of way traverses property originally private, but subsequently a public street, I have followed McDonald in allowing no value (beyond cost where he allows it). There are cases where the pipe lines do not exactly correspond with the street areas as finally laid out; in such cases the pipe is a few feet within the abutting property lines. Sometimes houses have been built over the pipe. If the pipe-lines were reproduced (as a basis for valuation in the period 1907-15), they would be laid in the public highways without cost for easements. This shifting of the identical line is in some sense a valuation by the substitutional method, which I have heretofore disapproved as a general method; but it is here applicable and justified by the Supreme Court's attitude on the question of paving over mains, in the case of *Des Moines Gas Co. v. Des Moines*, 238 U. S. 153.

The issue as to the width to be assumed in valuing easements

where the records of title specify none is not sufficiently serious, in money involved, to justify extended consideration. McDonald takes generally the width of the nearest easement where [45] a specification was made. This seems to me fair for the purpose of valuation.

In general, therefore, I have adopted as a basis McDonald's valuation at \$272,730 (Exhibit 169), less Dillman's exclusions of property not used, and deductions of tracts elsewhere accounted for (Exhibit 213), making the net value of the rights of way in use \$206,506. I have not everywhere agreed with McDonald's appraisal. There are instances where an entire parcel or lot was bought and is held for right of way purposes, and properly so, where McDonald values only the smaller right of way area. Parcel 127, map 8 (Exhibit 8), is such a case. Adopting Baldwin's appraisal, I have added \$7,361 to the city's appraisal. There are other instances. Next on the Baden-Merced branch, parcels 170, 176, 172, 171, 173, 174, 178, and 184, Map 8, bought in 1907 for \$50,000 in round figures, are valued by the city at \$27,500. I have adopted cost as a basis and have thus added \$26,500 to the city's appraisal. For the lines through the cemeteries, Cypress Lawn, Greenlawn, Woodlawn, and Holy Cross, I have added \$31,500. I have added for the Honda tunnel \$2,000. I have made miscellaneous additions, not necessary to specify, aggregating \$6,500. These additions bring the city's appraisal to \$280,367. I adopt \$280,000 as the proper valuation. This includes, however, an appraisal of easements through a portion of the Merced ranch lands claimed by the city to be not useful. In round figures, the value of these easements is \$30,000. If, therefore, I finally decide in favor of the company's contention that all the Merced ranch is properly to be valued in the property entitled to return in the rates, the value of the rights of way of plaintiff on December 31, 1913, will be taken at \$250,000.

[46] According to the stipulation of the parties (11,162), I find that the value of the right of way was the same throughout the years in controversy, 1907-1915. All of the properties here valued were acquired prior to July 1, 1907, so far as I can discover from the record.

RESERVOIR LANDS

In approaching the difficult question of the value of reservoir lands, it is well to have in mind the principles which the Supreme Court has announced. There seems to exist no conflict between

the parties here so far as the statement of these principles is concerned, though in their application they are wide apart. Mr. Searls, for the city, says (Arg. 1780):

“It would seem that the views of the United States Supreme Court, as set forth in the Minnesota Rate Case, would require us to value those lands at their market value for all purposes. Counsel * * * has suggested that these sites must be valued as in one ownership, that they constitute property which is both peculiarly adaptable and peculiarly desirable for public use, and that the fact of such adaptability and desirability must be taken into consideration in determining its market value. With this contention we are in entire accord with counsel. It is only in his method of applying the rule in determining the fair value of these reservoirs that we disagree with him. It is the question of ‘fair value’ and ‘reasonable value’ versus monopoly value.”

It will be sufficient to refer to a few leading cases. In *Boom Company v. Patterson*, 98 U. S. 403, decided in 1879, there was presented a case in eminent domain for the condemnation of certain small islands situated in the Mississippi river, peculiarly available for the construction of a boom. The jury found a general verdict assessing the value of the land at \$9,358.33, but accompanied it with a special verdict assessing its value aside from any consideration of its value for boom purposes at \$300, and, in view of its adaptability for these purposes, a further and additional value of \$9,058.33. The [47] court reduced the verdict to \$5,500. The plaintiff brought the case on writ of error to the Supreme Court of the United States. The judgment was affirmed. Justice Field said (p. 407):

“In determining the value of land appropriated for public purposes, the same considerations are to be regarded as in a sale of property between private parties. The inquiry in such cases must be what is the property worth in the market, viewed not merely with reference to the uses to which it is at the time applied, but with reference to the uses to which it is plainly adapted; that is to say, what is it worth from its availability for valuable uses? Property is not to be deemed worthless because the owner allows it to go to waste, or to be regarded as valueless because he is unable to put it to any use. Others may be able to use it, and make it subserve the necessities or conveniences of

life. Its capability of being made thus available gives it a market value which can be readily estimated.

“So many and varied are the circumstances to be taken into account in determining the value of property condemned for public purposes, that it is, perhaps, impossible to formulate a rule to govern its appraisal in all cases. Exceptional circumstances will modify the most carefully guarded rule; but, as a general thing, we should say that the compensation to the owner is to be estimated by reference to the uses for which the property is suitable, having regard to the existing business and wants of the community, or such as may be reasonably expected in the immediate future.”

In the *Minnesota Rate Cases*, 232 U. S. 352, there was presented, in a controversy over the validity of state legislation establishing railroad rates, the question of the principles of valuation of railroad right of way and other lands. The Supreme Court points out (p. 445) that the state of Minnesota had previously notified the railroad company to report the value of its properties in two columns, one “market value” and the other, “value for railway purposes.” Following what he understood to be instructions from the state, the company’s land commissioner, under the heading of “market value,” reported “not the market value in the proper sense of that term, but what in his judgment it would cost the railroad company to acquire the land.” This included an excess [48] over contiguous and similar property which he thought the company would have to pay on a reproduction of the right of way. It did not include payments for improvements existing when the acquisition took place, or for consequential or severance damages, or for the expenses of acquisition. These supposed additional outlays the land commissioner estimated by multiplying the “market value” thus found by arbitrary multipliers, and the amount thus found was called the “value for railway purposes.” The master thought the multiplier too large and cut down the increase for “railway value” by 25%; otherwise accepting the method and results of the appraisal. The foregoing applies to lands outside St. Paul, Minneapolis and Duluth. As to the terminal yards and right of way in these cities the master accepted appraisals of St. Paul and Minneapolis property deemed by him large enough to include “railway value,” adding to this 5% for “cost of acquisition and severance damages” (pp. 443, 449); and “with respect to the Duluth property, where the appraisal appears to have rested upon the ordinary

values of real estate" (449), the master added 25% "for railway value, cost of acquisition and consequential damages" (443, 450). To the values thus obtained of lands within and without the cities, the master added 4½% for engineering, superintendence, and legal expense, and, compounded on that sum, 15%, composed of 5% for contingencies and 10% for interest during construction (pp. 442, 450).

The court declined to acquiesce in the view that in condemnation proceedings the company would be compelled to pay more than the fair market value of property. Mr. Justice Hughes, for the court, then reviewed the authorities upon value in condemnation proceedings in the following language (p. 451):

[49] "It is urged that, in this view, the company would be bound to pay the 'railway value' of the property. But, supposing the railroad to be obliterated and the lands to be held by others, the owner of each parcel would be entitled to receive on its condemnation, its *fair market value* for all its available uses and purposes. (*United States v. Chandler-Dunbar Water Power Co.* decided May 26, 1913, 229 U. S. 53.) If, in the case of any such owner, his property had a peculiar value or special adaptation for railroad purposes, that would be an element to be considered. (*Mississippi and R. River Boom Co. v. Patterson*, 98 U. S. 403; *Shoemaker v. United States*, 147 U. S. 282; *United States v. Chandler-Dunbar Water Power Co.*, *supra*.) But still the inquiry would be as to the fair market value of the property; as to what the owner had lost, and not what the taker had gained. (*Boston Chamber of Commerce v. Boston*, 217 U. S. 189.) The owner would not be entitled to demand payment of the amount which the property might be deemed worth to the company; or of an enhanced value by virtue of the purpose for which it was taken; or of an increase over its fair market value, by reason of any added value supposed to result from its combination with tracts acquired from others, so as to make it part of a continuous railroad right of way held in one ownership. (*United States v. Chandler-Dunbar Water Co.* and *Boston Chamber of Commerce v. Boston*, *supra*.) *There is no evidence before us* (italics mine) from which the amount which would properly be allowable in such condemnation proceedings can be ascertained."

There is here, it seems to me, a plain intimation that if the company had shown under the heading "market value," the value

as defined in the quotation, instead of the excess value due to the compulsory nature of the acquisition, the Supreme Court would have accepted such an appraisalment.

Continuing, Justice Hughes pointed out that it was mere speculation to attempt to estimate the actual cost of acquiring the right of way if the railroad were not there; all values of property along its line largely depend upon its existence. While the court recognized the usefulness of the cost-of-reproduction method when reasonably applied and when ascertainable with reasonable certainty, it rejected that method in this case, as resting upon an impossible hypothesis.

[50] The court stated the question to be whether the railroad, for rate-fixing purposes, was

“entitled to a valuation of its right of way not only in excess of the amount invested in it, but also in excess of the market value of contiguous and similarly situated property.”

The opinion continues (454):

“It is clear that in ascertaining the present value we are not limited to the consideration of the amount of the actual investment. If that has been reckless or improvident, losses may be sustained which the community does not underwrite. As the company may not be protected in its actual investment, if the value of its property be plainly less, so the making of a just return for the use of the property involves the recognition of its fair value if it be more than its cost. The property is held in private ownership, and it is that property, and not the original cost of it, of which the owner may not be deprived without due process of law.”

I interrupt the quotation to remark that this is one of the statements in the decisions of the Supreme Court that confirm me in the belief, previously expressed, that, in the normal case, there is no difference between value for rate-fixing purposes, and value for condemnation or voluntary sale.

“But still it is property employed in a public calling, subject to governmental regulation, and while, under the guise of such regulation, it may not be confiscated, it is equally true that charges to the public shall not be unreasonable. And where the inquiry is as to the fair value of the property, in order to determine the reasonableness

of the return allowed by the rate-making power, it is not admissible to attribute to the property owned by the carriers a speculative increment of value, over the amount invested in it and beyond the value of *similar property owned by others, solely by reason of the fact that it is used in the public service.* (Italics mine.) * * *

“Assuming that the company is entitled to a reasonable share in the general prosperity of the communities which it serves, and thus to attribute to its property an increase in value, still the increase so allowed, apart from any improvements it may make, cannot properly extend beyond the fair average of the normal market value of land in the vicinity having a similar character.”

[51] The court therefore disapproved the valuation by reference to “railway value,” by multipliers, and with conjectural costs of acquisition and consequential damages; and also, “in this view,” disapproved the additions for engineering, superintendence and legal expenses, contingencies and interest during construction.

It may be doubted whether the disapproval of additions for legal and other so-called overhead costs was not stated with reference to the facts of the particular case, particularly the improper method of ascertaining basic values. If the property of the railroad had been newly acquired by condemnation, following the principles here announced, it would seem that the attending legal and other expenses would have been allowed as part of the value. But the matter is doubtful; and in the appraisal I have made of the plaintiff’s real estate, I have followed the letter of this decision, and have not reckoned in any overhead additions.

I have here stated this important case with perhaps undue detail in view of a general misunderstanding that special adaptability or unique availability of particular property cannot, under this decision, be given effect in increased value, but must be appraised according to the general level of property in the neighborhood, not having that special availability. This would amount to an overruling of *Boom Company v. Patterson*, which, on the contrary, the court approved. The gist of the decision was that the court refused to recognize an increase of value due solely to the use of the property in the public service, or any “monopoly value”; and refused to admit that condemnation proceedings necessarily resulted in excessive awards. It must be [52] noticed that the criterion of comparison is neighboring lands described as “of like character,” “similar,” “of similar character.” Now a tract similar

in some respects may be dissimilar or may become so, by reason of its location. Everyone has seen city lots fitted for residence acquire a business character almost over night by reason of the establishment of an important transfer point on the street railways. The islands in the Boom Company case had an added value by reason of favorable location, though perhaps not dissimilar in other respects to other islands. So in this case, it is open to plaintiff to contend and to prove if it can, that the reservoir areas are more valuable than the surrounding watershed. This is made even more clear by the latest decision of the Supreme Court, next referred to.

City of New York v. Sage, decided November 8, 1915, 239 U. S. 57, involved proceedings in condemnation of land needed for the Ashokan reservoir, a part of the system of greater water supply of New York city, now under construction. The commissioners in condemnation had allowed for the land the sum of \$11,948.90, which they specified was composed of \$7,624.45 for land and buildings, and the further sum of \$4,324.45 for reservoir availability and adaptability. The Supreme Court reversed the decisions of the lower courts and said:

“The only explanation of the separation of items by the commissioners is that they were not prepared to say that the market value of the lot was \$11,948.90, seeing that the claimant bought it a few days before for \$4,500, but that they thought the additional value gained by the city’s act should be taken into account and shared between the city and [53] the owner of the land—a proposition to which we cannot assent. *Minnesota Rate Cases*, 230 U. S. 352, 451; *McGovern v. New York*, 229 U. S. 363, 372.”

I quote Mr. Justice Holmes’ statement of the principles of law involved, as follows:

“The decisions appear to us to have made the principles plain. No doubt when this class of questions first arose it was said in a general way that adaptability to the purposes for which the land could be used most profitably was to be considered; and that is true. But it is to be considered only so far as the public would have considered it if the land had been offered for sale in the absence of the city’s exercise of the power of eminent domain. The fact that the most profitable use could be made only in connection with other land is not conclusive against its being taken into account, if the union of properties necessary is so practicable that the possibility would affect the market

price. But what the owner is entitled to is the value of the property taken, and that means what it fairly may be believed that a purchaser in fair market conditions would have given for it in fact,—not what a tribunal at a later date may think a purchaser would have been wise to give, nor a proportion of the advance due to its union with other lots. The city is not to be made to pay for any part of what it has added to the land by thus uniting it with other lots, if that union would not have been practicable or have been attempted except by the intervention of eminent domain. Any rise in value before the taking, not caused by the expectation of that event, is to be allowed, but we repeat, it must be a rise in what a purchaser might be expected to give.”

The same distinction is pointed out in an interesting way in *Re Lucas* (1909), 1 K. B. 16. Vaughan Williams, L. J. (28) and Buckley, L. J. (36) say that “the possibility, and not the realized possibility, is the material factor.” I quote from the very clear opinion of Lord Justice Fletcher Moulton, as follows:

“(29) The owner is only to receive compensation based upon the market value of his lands as they stood before the scheme was authorized by which they are put to public uses. Subject to that he is entitled to be paid the full price for his lands, and any and every element of value which they possess must be taken into consideration in so far as they increase the value to him. * * * [54] (32) The existence of competition entitled the arbitrator to take special adaptability into account in arriving at the quantum of compensation. But the extent and the imminence of such competition must have an important bearing on the weight to be given it as affecting the quantum of compensation. * * * (35) No element of that which economists call ‘value in use’ can, in my opinion, increase compensation, unless it is either a ‘value in use’ to the seller or a ‘value in use’ to persons other than the proposed purchaser so as to introduce the element of competition as a factor in fixing price.”

In *United States v. Chandler-Dunbar Co.*, 229 U. S. 77, the court, in allowing availability for lock and canal purposes as an element in value, said:

“Although it is not proper to estimate land condemned for public purposes by the public necessities or its worth to the public for such purpose, it is proper to consider the

fact that the property is so situated that it will probably be desired and available for such a purpose.”

See also *Moulton v. Newburyport Water Co.*, 137 Mass. 163, 167; *Spring Valley Waterworks v. San Francisco*, 192 Fed. 157, 160, and *Lewis, Eminent Domain*, 3rd Ed., sec. 707.

There is an intimation conveyed by the language of *New York v. Sage* that the Ashokan reservoir lands would be worth more to the city after condemnation than to the prior owners before condemnation. If so, it would appear that the city of New York, and here the plaintiff, might claim return in the rates on that higher valuation. But counsel for both parties here seem to understand (arg. 563) the Minnesota Rate Case as in effect requiring a valuation of the land for rating purposes the same as it would be fixed upon a condemnation by plaintiff in the years in controversy, *i. e.*, its market value in the hands of an owner who did not himself make avail of the adaptability for reservoir uses. I shall adopt the same course without passing [55] on the validity of the point mentioned; we certainly will not on this plan be misled into allowing an excessive value.

The value to be thus ascertained is a difficult question of fact. It is peculiarly difficult here. For not only have we the ever-present impossibility of using earning power as a guide to value, even if that could be determined, but there are no transactions involving comparable reservoir lands to indicate the judgment of the market. The few reservoir sites that exist in the vicinity have been owned by the plaintiff for many years.

The factors which enter into the utility of reservoir areas are obviously the presence of a natural basin of large storage capacity, and an outlet, preferably narrow, suitable for a dam. For storage reservoirs, Mr. Cory names in addition these elements:

“sufficient watersheds behind them, precipitation satisfactory in amount and character, practicable cost of structures, sufficient market for stored water, satisfactory character of geological formation, precluding excessive leakage losses, etc.” (1351).

Counsel for the city is right in his contention that value for reservoir purposes is not necessarily greater than the value for alternative uses. It may be no more than equal to it, for example, where the demand for its alternative uses, *e. g.*, residences, creates a value which represents the economic limit of practicable cost for reservoir uses. Or, as in the case of Mr. Dillman’s ranch in the

mountains (6504), the demand for its special availability for a reservoir does not exist. Again, as in the government reclamation projects referred to by Mr. Means, there may be no competition to give value to the special availability. We may [56] conceive the case of an excellent reservoir having no alternative use, as for lack of soil. Its value would depend entirely upon the demand for its reservoir use, and, though more useful in that aspect, would likely be worth less in the market than if it had soil to give it an agricultural use. It is all a question of demand, present or properly to be anticipated in a reasonably near future, or as Moulton, L. J., in *Re Lucas* described it, of competition. And that also is affected by supply, the number of other reservoir sites available. Therefore it may result that reservoir availability will in a given case affect market value to the extent of a large increase over value for alternative uses.

The following appraisals are offered for my determination:

	Acreage	Grunsky		Dillman		Cory
		per A.	Total	per A.	Total	
Merced Lakes.....	336	\$1000	\$336,000		\$ 0	.....
Crystal Springs						
Lake	1493G	1400		\$320	471,680	.....
	1474D					
San Andreas Lake...	498G	1400		200	88,400	.....
	442D					
Pilarcitos Lake.....	109G	1400	2,940,000	45	1,260	.....
	28D					
Calaveras Reser-						
voir	1930	200	386,000	100% val. ordi-	600,000	
				nary uses		
San Antonio Reser-						
voir	656	125% val. ordi-	100% val. ordi-	80,000		
		nary uses	nary uses	or 133%		
Arroyo Valle Res-						
ervoir	630	125% val. ordi-	100% val. ordi-	50,000		
		nary uses	nary uses	or 133%		

Mr. Dillman's total for the three peninsular reservoirs is \$561,340; but this value does not all appear in the city's final appraisal. Mr. Dillman accepts Mr. Smith's testimony that his appraisal of adjacent watershed included an amount of \$402,182 for value of the lake view, and takes the difference, \$159,158, as the value to be accorded to the reservoirs. (6498.) He carries a

slightly varying figure, \$159,370, into his final summing-up in [57] behalf of the city. (Exhibit 213, Table III.) This is to be compared with Mr. Grunsky's appraisal of \$2,940,000. One or the other appraiser is fundamentally wrong.

Merced Lakes

Mr. Dillman says (6505):

“The use of Lake Merced for a water supply is a temporary one and in the very near future it will in my opinion be abandoned as such; for that reason I do not consider that it has any special value for reservoir purposes. It has real estate value.”

This is not a well-considered opinion. These lakes were during 1907-15 and are now an essential element in the daily supply. When Calaveras reservoir is completed, they will not be abandoned, but will fulfill a useful function as a reserve supply for emergencies. And as for the “real estate value” which he concedes, we look in vain for specific allowance in value either in Dillman's appraisal or that of any other witness for the city. Perhaps Mr. Dillman meant that if the lakes did not exist, an award in condemnation would not recognize special availability for reservoir uses as worth more than the availability of the land for other uses; but, as I have said, he includes no such item in his appraisal.

We are not in doubt as to the attitude of the city. In appraising the Merced watershed, the city's witnesses, Mr. Martin (4007) and Mr. Paschel (4090) gave favorable consideration to the lake views in the way of enhancing values; both disclaimed any knowledge of their value for water-supply purposes, and did not include it. In other words, they assumed that the watershed and the lakes were to be sold as a unit for real estate subdivision, and that there was no present or reasonably imminent demand for the lakes for reservoirs. Obviously, they would necessarily have [58] made the same appraisal if the lakes were reserved from the hypothetical sale, though Mr. Paschel did say the right of access to the lakes had “some value”. On this theory, the city could condemn the lakes and their margins at the value of the margins, and obtain these reservoirs for nothing. The contention seems untenable from every point of view.

Mr. Grunsky, for the plaintiff, values the 336 acres in the Merced Lakes at \$1000 an acre, a total of \$336,000. (1231.) This is

approximately the value of the gullies leading into the lakes. (Compare Appendix 1, parcels 3, 5, 8.) In other words, if the lakes were not there, and their sites to be condemned, the land would resemble and probably be no worse than these gullies. To thus assume no additional value for reservoir availability over the value for other uses seems fair and conservative.

Accordingly I find that the 336 acres in the Merced Lakes were of a market value of \$336,000, or \$1000 per acre, during all the years 1907-1915. I think they were worth that in 1907, and, in view of their future partial abandonment as described, I do not believe they can be considered as increasing in value during this period. (1231.) Neither do I think they would decrease below the value of watershed lands of similar character.

Peninsular Reservoirs

There is some confusion as to the acreage of these three reservoirs. I have accepted in general the final estimates of Mr. Sharon, which are used by Mr. Grunsky. (Sharon, p. 9463, Exhibit 180, Exhibit 12hh, Grunsky, p. 1236.) I deduct from Sharon's estimate of Crystal Springs area, 1493 acres, an area of 10 acres, approximately the amount in the Phelps tract, not owned by the plaintiff, but occupied under an option, and thus obtain an area of 1483 acres.

[59] I have referred to the absence of criteria of value of reservoir lands, for example, comparable sales, which would approximate a demonstration of the value sought to be determined. But the law does not require a demonstration, but only such certainty of proof as the nature of the case permits. In this case we are thus dependent almost entirely upon the judgment of expert witnesses. The task before such witnesses is to formulate and justify to the court a judgment as to the state of mind of assumed buyers and sellers of these tracts, during the years in question, assuming the reservoirs were not in existence; in other words, the value in condemnation, according to principles already stated. The court is not bound to accept the judgment of such witnesses, baldly stated. It will be considered in connection with the qualifications and manner of testifying of the witness—the source of the judgment, and in connection also with the clearness, consistency and reasonableness of the reasons given for that judgment, the mental processes upon which the judgment was formed. These witnesses in the cases at bar are George L. Dillman, for the city, and C. E.

Grunsky, for the water company. Their testimony will be considered in the order named.

Mr. Dillman is a civil engineer whose professional experience and observation have touched to some extent upon water reservoirs and their value. He is entitled thus to offer an opinion. But, making every allowance for the inherent difficulty of the subject, one must conclude that the reasoning by which he formed and supported his judgment was neither clear, consistent [60] nor carefully considered. There is some suggestion that his testimony was rather hastily prepared (6582); it bears evidence of it both in the direct and especially in the cross-examination. He approaches the problem first from the standpoint of cost plus appreciation. He says (6498):

“If the lands had not been purchased then but had been recently acquired, the original cost (value) should have increased about as other agricultural lands, say 5% per annum.”

This means that the capital value of farm lands increases at 5% a year, which necessarily implies a compounding of the percentage of increase; but he means to apply 5% at simple interest. Continuing:

“The reason for using 5% is based on my opinion that real estate investments properly made should yield about 5% to the investor, and while in some cases they do not—and in other cases they yield a great deal more—if a man is assured of 5% on that kind of investment with that kind of security, it will receive a great consideration by the investing public.”

This language plainly refers to income from farm lands, and is quite consistent with no increase at all in the value of the land; and it is therefore hard to see how it has any bearing on the proper determination of the annual rate of appreciation of the land values. Continuing:

“It seems to me, moreover, that if the owner is allowed 5% a year appreciation in the value of reservoir lands, in the long run the increase in value of his investment will approximate the increase in value for other classes of real estate investments and that full justice will be done.”

He here returns to his first position. In determining cost of the reservoir lands originally, it is found that every purchase was partly within and partly without [61] the flooded area. Mr.

Dillman assumes that the cost per acre was at an equal ratio for both reservoir and watershed. He then, from original costs where known, finds the *average* original cost per acre of each reservoir. He finds these to be: Pilarcitos, \$12.13; San Andreas, \$60.43; Crystal Springs, \$114.24. (Exhibit 132, Table 1.) At Pilarcitos, he was able to satisfy himself of original costs of only three parcels out of six, or 27.90 acres out of 132.40 acres of reservoir area. One of these selected parcels was acquired in 1866, one in 1870 and one in 1890. The basis for averaging is thus not very complete. He then approximates the elapsed time since purchase at 50 years for Pilarcitos, 46 years for San Andreas, and 36 years for Crystal Springs; thus finding percentages of increase, at 5% simple interest basis, of 250%, 230% and 180% for the three reservoirs respectively. Computing on this data from original cost, he arrives at these values for 1913 (6498):

Crystal Springs ..180%, 1474 acres at \$320	\$471,680
San Andreas.....230%, 442 acres at 200	88,400
Pilarcitos .....250%, 28 acres at 45	1,260
	<hr/>
	\$561,340

Without much consideration, one is inevitably impressed with the apparent ineongruity of figures for the value of the land at Pilarcitos which makes that very important and valuable engineering element possible. Mr. Dillman says in effect that it was worth no more than a moderate-priced automobile. There is obvious an error in acreage; the 28 acres was the basis of original cost, but the existing acreage is 109. This would increase the appraisal \$3645 to \$4905—still in the automobile class. One [62] is thus at once inclined to doubt the soundness of the reasoning.

As stated, the parcels in these reservoirs when acquired were situated partly in the reservoir area and partly in watershed. Dillman's original cost prices were for the entire parcel unsegregated. His principle of increase at 5% in an arithmetical progression would necessarily apply equally to reservoir and to watershed. The watershed also would be worth \$320, \$200 and \$45 per acre at the three reservoirs. This does not check with Mr. Smith's or my own appraisal. The Crystal Springs figure is too high, the others too low.

Furthermore, the method of calculating a percentage increase of value, as an arithmetical progression, *i. e.*, by simple interest, is logically unsound. The percentage depends on the length of the

series, though the increase in dollars each year may be the same. Thus, suppose these properties were bought forty years ago for \$100,000. By Dillman's method and on his assumptions, they would now have increased forty times 5% of the cost, 200% or \$200,000, and be worth \$300,000. Now, suppose the purchase had been delayed twenty years; by this method the land would have increased 100% and would cost \$200,000. To get a value of \$300,000 now, twenty years later, we must assume a $2\frac{1}{2}\%$ increase per annum. But Dillman says the rate has been 5% on a simple interest basis. At this rate, the value would have increased 100% over cost, or \$200,000 and be worth \$400,000. In other words, its present value, \$300,000 or \$400,000, depends upon the length of time it has been held—an obvious absurdity.

The reasoning that underlies this assumption of 5% simple interest increase is thus seen to be a mere form of words, without substance. And furthermore, this elaborate calculation from [63] original cost was quite unnecessary. For since the fundamental assumption was that at all times since original acquisition the portions of the parcels in the reservoir were worth the same as the portions in the watershed, we could by calculation from watershed values already found determine the value of the reservoir areas.

Mr. Dillman refers to the method just mentioned as an alternative method. He does not assume an ability to value the lands on this basis, but after "a casual examination" of the figures of the other witnesses assumes certain average values. His own contribution to the problem is an estimated percentage of increase over these averages, which he fixes at 25%. It is not certain what this additional percentage represents. He speaks of it variously: pages 6499, 6520, 6530, 6548, "proven feasibility"; 6521, 6534, 6543, "proven feasibility and absolute killing of all value for anything but reservoir purposes"; 6546, "greater usefulness and value for reservoir purposes"; 6549, "unification in one ownership"; 6589, unification and proven feasibility, not including expense of acquisition.

The witness gave some conclusions based on the relation of cost of storage to reservoir values, but failed to maintain them on cross-examination. He also referred to sale prices and asking prices of various reservoir sites elsewhere in California. We fail to find in these instances any showing either as to increase of value over original cost, comparable to Dillman's 5% method, or of relation of reservoir value to watershed value, comparable to his 25% method. Indeed, they were not cited to that end; but only to the point that

there [64] does not invariably exist a ratio of ten for reservoir value to one for watershed value, a contention that could not well be made. The ratio will undoubtedly vary from one to one to ten to one, or even beyond that, depending in each case upon the demand, or, as Justice Moulton, in *Re Lucas*, expresses it, upon competition, actual or reasonably to be anticipated. To this critical point, of demand for these reservoir lands on the peninsula during this period, Mr. Dillman has paid no attention, and given no effect. In brief, we are left with nothing tangible beyond an expression of his judgment, based on his experience and observation, that a proper award in condemnation could be determined by figuring 5% per annum upon cost to the owner of the lands condemned, or by averaging the value per acre of adjoining lands and adding 25%. From this would in consistency be deducted any increase in value that might accrue to watershed lands owned by the same defendant in condemnation, by reason of lake view, and if that defendant owned all the reservoir lands and only a portion of the watershed, the like accretion in value of his neighbor's lands. Thus stated, the proposition, of course, defeats itself. As for the 5% and 25% methods, they are purely arbitrary in the sense that the same reasons would support percentages half or double these with equal force. There is little here to exercise one's reason upon.

The city also proved by the witnesses Bayley and Martin that Los Angeles recently bought land in the mountains near by, for use as reservoirs in connection with its aqueduct, at prices showing no advance over values of adjacent property. After reading the reply testimony of William Mulholland, chief engineer of [65] the Los Angeles water department, I am unable to find any significance in the circumstances of the Los Angeles purchases. (11066 *seq.*) He shows that the sites bought were not particularly desirable from an engineer's standpoint; others as good could be obtained. Some of the land was donated. In some cases the presence of the reservoir, by its assurance of water, made other land of the sellers valuable; there was a competition of sellers in this regard that tended to low figures.

The foregoing fairly represents the positive features of the city's case. It is not very satisfactory. The negative features—the criticism of Mr. Grunsky's evidence—I consider later. In considering the city's case first, I do not forget that the burden of proof is entirely upon the plaintiff. But my views accord more nearly with

those of Mr. Grunsky, and I have thought it desirable that discussion of his testimony should immediately precede my findings.

Since Mr. Grunsky does not again appear as a witness, I refer here to his qualifications (1205). He has had extensive experience in hydraulic engineering. From 1877 to 1888 he was employed by the State Engineer of California in matters of irrigation, drainage and flood control. He then began private practice. In 1889 and 1890 he was a member of the State Commission on Rivers and Harbors to report upon problems connected with the Sacramento and San Joaquin rivers. In 1892-3 he was a member of the Sewage Commission for San Francisco, and in 1899 was engineer in charge to design that city's sewer system. In 1894-5 he was consulting engineer to the Commissioner of Public Works of this state. From 1900 to 1904 he was City [66] Engineer of San Francisco. In 1904-05 he was one of the Isthmian Canal Commission in charge of the Panama Canal construction. He then became consulting engineer to the United States Reclamation Service, and was adviser to the Secretary of the Interior in that service until 1907. He has since been in private practice. He has been long familiar with the Spring Valley water properties and with the problems of water supply to this city. In 1886 he was consulted by the company in connection with the acquisition of the Crystal Springs dam-site. Later he was called by the defendant in the proceedings in condemnation brought by plaintiff's predecessor to acquire the Drinkhouse property in the Crystal Springs reservoir area. As city engineer he made valuations of these properties now under appraisal and rendered reports to the supervisors which were used in connection with rate-fixing by that body. These valuations included appraisals of the reservoir sites. He made reports and estimates on the Hetch-Hetchy and other available sources. He was a witness for the city in the 1903-04-05 cases before Judge Farrington (192 Fed. 137).

Mr. Grunsky is therefore entitled to speak with authority. His testimony was well considered and conservatively stated; his evidence, his bearing on the stand and his past affiliations suggest an impartial mind. He has been familiar with this problem for many years. It does not follow that we must accept his conclusions in their entirety, but the general factors named are influences to a favorable state of mind.

Mr. Grunsky's testimony is to be found at pages 1205 and [67] following, pages 7860 and following, 8170 and following

and pages 8250 and following. He recognizes that in the matters before us the market value of the reservoirs cannot be demonstrated, or even reached with the same approximate certainty as in the case of the lands capable of general uses. He states his problem to be "to determine the effect upon the market of all the circumstances bearing upon each case" (1210). In reaching his final figure of \$1400 an acre for the peninsular reservoirs, he first testifies as to the results of a study based upon original cost of the land. It constitutes the bulk of his evidence; but this was due to the number and intricacy of the calculations necessary, and the amount of explanation required to make his methods clear. The witness apparently does not give it controlling effect in the formation of his judgment, for he says (1224): "a study of this kind, while it is interesting and instructive, cannot be accepted as conclusive." In brief, his method is to find an average of the costs of the various parcels of reservoir land; to determine an average date of acquisition of the parcels in the three different reservoirs; to obtain from government census reports and county assessor's valuations a percentage of annual increase in the value of farm lands; and by an application of these factors to approximate resulting indicated costs of the year 1913. Having reached figures for each of the three lakes, he adopts a figure deemed applicable for all of them considered as a unit. The theory, of course, has inherent limitations; we have seen elsewhere that actual costs often vary above and below the average market price which we take as value; thus not only do costs of the same year [68] of similar property often vary widely, but costs of different years vary in specific cases from the indicated figures that the percentage of annual increase generally would imply. The process of averaging referred to is assumed to equalize these variations and the assumption seems to be the most reasonable one we can make.

The chief difficulty with Mr. Grunsky's calculations in this regard arises from the fact that the problem cannot be thus simply stated. While the theory assumes that the original costs of the reservoir parcels are known, the fact is that the lands were not thus acquired; the known original costs are of lands composed partly of reservoir areas and partly of watershed areas. Mr. Grunsky therefore attempts first to segregate and determine the assumed greater cost of the reservoir portion and the lesser cost of the watershed. The city challenges the validity of this assumption *ab initio*. In part this challenge is without merit. Mr. Grunsky

points out, and it must be so, that, apart from special availability for reservoir purposes, the reservoir areas, comprising the floors of the valleys, were naturally better fitted for farms and country homes, and therefore were worth more than the land of the same parcels farther up the hillsides. But whether the special worth for reservoir purposes was also effective to raise the ratio of the valley lands at the time of the first purchases or later cannot be answered with confidence. The early purchases probably were at values for general uses; the later showed the developing market demand for the lands capable of reservoir use, Mr. Grunsky says (1224); his idea appears to be that the averaging of prices of acquisitions [69] over many years takes care of this difficulty. The method by which he finally arrives at an original ratio of cost of ten for reservoir portions against one for watershed portions is too complicated to be described in any clearly illustrative way. Mr. Searls, in his argument for the city (Arg., p. 1786), describes the process quite clearly and briefly, and I therefore quote what he says:

“He selects certain parcels having a greater or less submerged area which he classifies as reservoir parcels; and certain other parcels having a smaller submerged area which he classifies as watershed parcels. * * * He compares the average original cost per acre of the two classes thus segregated, and finds that the lands he has classified as reservoir lands cost approximately four times per acre what the lands he has classified as watershed lands cost. He then takes each of the parcels he has classified as reservoir parcels and tabulates them so as to show the exact acreage in the reservoir and the exact acreage in the watershed, and segregates the average cost per acre between the reservoir acreage and the watershed acreage on the first indicated apportionment of four to one. He then ignores the watershed acreage in that parcel and derives by this second indicated cost, as he calls it (8252 *et seq.*) an average price of \$406 per acre for the reservoir acreage of the lands he has classified as reservoir lands. Similarly he takes each of the parcels that he has classified as watershed lands, subdivides them into watershed and reservoir acreage on the bases of four to one, and applies the factor 1 to the watershed acreage only, ignoring the reservoir acreage, and obtains an average cost per acre of \$38 for the watershed acreage of the lands he has classified as watershed lands. From the results of these two approximations, he concludes that the reservoir acreage in the

parcel cost originally more than ten times as much per acre as the watershed acreage.

"He next takes the census reports showing the increased valuation of San Mateo County properties and derives therefrom the information that farm lands have increased in value since 1870 at the rate of about 5% over the years since 1870, compounded annually. He applies this 5% compound interest to his derived cost of \$406 as of the average year of purchase, 1882, and determines that the Crystal Springs lands were worth, in 1913, about \$1950 per acre.

[70] "By similar methods he determines that Pilarcitos would be worth \$505 and San Andreas \$1400 per acre in 1913, and concludes that \$1400 per acre would be a fair price for all the peninsula reservoir lands as of December 31, 1913."

The above is a bare outline of the reasoning and calculations by which Mr. Grunsky endeavors to inform his judgment. The process described results in a weighted average of \$1750 per acre (1247), but he takes \$1400 as a conservative estimate. He finds corroboration in the fact, that upon these assumptions, the reservoirs were worth \$1070 per acre in 1903, which is comparable with the valuation of \$1000 per acre adopted by Judge Farrington in the 1903 case. He finds also that his assumptions as to original segregated cost of watershed and as to probable rate of appreciation are confirmed by the appraisals of Baldwin and Hoag, witnesses in this case, of watershed values in 1913 (7872). These items of corroboration are undoubtedly entitled to weight.

I recognize that as the city attorney has pointed out (Arg., 1791), calculations from the original costs as a basis depend upon the correctness of Mr. Grunsky's selections of representative tracts for designation as reservoir areas and watershed areas respectively. I have no doubt that Mr. Grunsky has done this as fairly and conservatively as he knew how. If it were not for the items of corroboration just referred to, I would regard this whole cost calculation as too speculative and uncertain to be entitled to much weight. And even with such corroboration, I find my judgment relying rather on other considerations referred to by Mr. Grunsky; in fact, my opinion would be the same if he had not stated the details of his study from [71] original costs. For this reason, I do not pause to examine in detail the reasonableness of his segregations of original parcels into those representing reservoir lands

and those representing watershed lands, the validity of which has been strongly attacked by the city.

The factors which to my mind were most satisfactorily determinative of market value in 1913 and other years here concerned were: (1) the state of the market for these reservoir lands; (2) the valuation by Judge Farrington; (3) prior valuations by persons in authority and others.

As a preliminary to this discussion, I note the fact, not mentioned by counsel, that in 1861 the lands composing the Lake Honda distributing reservoir, parcel 362, situated beyond Twin Peaks were bought for \$1000 per acre. The population of San Francisco was then about 60,000 (Exhibit 12m, 1242). It was situated then and in fact remained until very recently, outside the area of thick settlement and high land values. This fact throws no light upon the value of the peninsular reservoirs, further than to indicate that \$1000 per acre for lands of that character is not to be considered beyond the limits of possible appraisement.

We are justified, too, in bearing in mind the fact that the Merced reservoirs have been in this case found to be worth \$1000 per acre, valued on the basis of adjacent land of similar character and without any increase by reason of availability for special uses. By reason of its low level, its limited supply and poorer quality of water, and its approaching disuse except for emergencies, its value is necessarily less than the principal [72] reservoirs of the system; on the other hand, proximity to valuable lands and shortness of conduits are influences tending to raise the value. It may well be that these counteracting influences may properly be considered in balance. At any rate, we may say that there is here some indication that the peninsular reservoirs are worth not less than \$1000 an acre.

Attacking our problem directly, what was the state of the market for reservoir lands in the years 1907-15? For this purpose, I assume that the reservoirs were not in existence, that the reservoir lands were in private hands devoted to other uses than public uses, and, to meet the suggestions of the Supreme Court in the Sage case, and of the English court in the Lacas case, that condemnation proceedings had not been begun. All these assumptions are in favor of the city. What then would be the conditions of supply and of demand that would govern the determination of market value?

As for the supply, these three reservoirs are unique and indispensable. There are no others on the peninsula or elsewhere within

a similar distance comparable with them. Mention was made of a reservoir site at Belmont, and one at San Miguel, in or near the city and county of San Francisco. Both would be small regulating reservoirs in no way adequate substitutes for the three under appraisal; and in addition, Belmont being nearer the expensive residence district, and San Miguel near San Francisco, the values of neighboring lands are higher than those around the Spring Valley lakes.

And, if we accept the view of the Lucas case that it is competition, actual or reasonably to be anticipated in the near [73] future, that gives added value on the score of special availability and adaptability, then we would have here actual competition in the purchase, one demand coming from the present plaintiff and one from the defendant city. It is plain from the record that the city needed and needs these reservoirs to complete its proposed water supply from the Hetch-Hetchy sources. And in the particular discussion, in fairness to the plaintiff, the city, as a creator of demand, is to be regarded as if it were another water company proposing to supply San Francisco.

To assist our thinking as to what would be the market value, we may visualize the situation as being one of sale from a private owner or owners, as willing sellers, to willing purchasers, either the present plaintiff, the city, or any other person that may be conceived. The price thus arrived at would be the same as the award in a condemnation, as I understand the law. In bartering together, they would perhaps rehearse the various considerations I have referred to. Conceivably also they would consult Mr. Grunsky and Mr. Dillman, for expert opinions. They might also discuss the effect of the Drinkhouse sale and the Hetch-Hetchy sale, which I refer to later. It is hard to conceive that they would be far apart, considering the presence of competition, unless the seller endeavored to obtain a prohibitive or monopoly price. Let us, to avoid that, assume that the seller took Mr. Grunsky's judgment and asked \$1400 per acre; and that, nevertheless, in view of the absence of comparable sales or demonstrable values, their minds were in an uncertain state as to market value, like a chemical solution needing a precipitant to induce crystallization. I think without doubt Judge Farrington's [74] decision and Mr. Grunsky's prior valuations as City Engineer would furnish such a precipitant. I have no question that the parties would agree that the starting point must be a value of \$1000 per acre in 1903. Where the whole matter is uncertain, a decision

of the question by one in authority is usually readily received by the human mind so as to make an end of thinking.

The city, in view of its present position, naturally objects to any consideration of Judge Farrington's valuation in the prior case. In that case, the court had before him the valuation of Mr. Grunsky, then a witness for the city, at \$1250 (8176), and of Mr. Schussler, as of 1901, at \$1000, as "a low estimate" (192 Fed. 161). Of course as heretofore stated, the city is not bound by the prior decision as *res judicata*; and if here as in the case of watershed lands, the city could command evidence that would prove Judge Farrington wrong, it was open to the city to do so. But this it has fallen far short of doing; and in consequence, the Farrington determination of an inherently uncertain matter would remain a potent influence in crystallizing market value. The same effect would have come about if Judge Farrington had been an arbitrator in an agreed proceeding where neither party had consented to be bound. If it be said that the decision was rendered in 1911, and could have no effect on the market for the years preceding, it may be answered that Mr. Grunsky, while City Engineer of San Francisco from 1900 to 1904, and as witness for that city in 1904 or 1905 had valued these reservoirs at \$1250. Counsel complains that Mr. Grunsky is at the bottom of all such valuations; but this is the city's misfortune, if his judgment was in error. Coming from the official engineer of the municipality, [75] his opinion would necessarily have a potent effect in determining market value—the consensus of opinion of buyers and sellers.

I have mentioned the Drinkhouse and the Hetch-Hetchy sales. The facts of the former are agreed. The Spring Valley Water Works, about 1886, brought suit against Drinkhouse to condemn land needed for the Crystal Springs reservoir. It concerned the land now known as parcel 94, containing 14.45 acres, 9.50 acres of which is now under water and the balance, 4.95 acres, in the watershed. The map shows that the latter portion is a marginal strip. Undoubtedly in the condemnation and subsequent proceedings it was all treated as reservoir land, since there was left for future purchase the balance of the Drinkhouse land, 34.45 acres (parcel 182), all watershed. We may reasonably infer that the 4.95 acre strip was included, either for a safe assurance that all land subsequently flooded should be first condemned, or, possibly, on a calculation of what would be under water when the dam reached its ultimate height. In the trial court (8177) the award was \$4,667.50 for

land and improvements, \$435.50 for severance damage, and \$100 costs, a total of \$5203, or \$362 per acre. The defendant appealed to the Supreme Court of California, which in 1891 reversed the judgment (92 Cal. 533) on the ground that the lower court had erred in rejecting evidence of value due to special availability for reservoir uses, and also in refusing to permit Mrs. Drinkhouse to give her opinion of the value of the land. Meanwhile the plaintiff, under the statute, had deposited in court the additional sum of \$5000 and entered into possession. Nothing appears as to any further trial; but it is in evidence that the land was conveyed to the water company [76] by Drinkhouse in 1887, before the appeal was decided, and that the cost was \$10,248.55, or \$709.24 per acre. The city's position is that this instance shows nothing but a judicial determination of the value at \$5203. But this is obviously untenable; a reversed judgment, excluding consideration of pertinent evidence, shows nothing but error. On the contrary, the subsequent voluntary settlement of the parties shows a meeting of minds on the value of \$10,249. This transaction more than corroborates Mr. Grunsky's appraisal of \$1400 per acre in 1913. For if, for illustration, we take Mr. Dillman's estimate of 5% yearly increase, calculated as simple interest, the increase during 26 years to 1913 would be 130% of \$709, giving an indicated value of \$1630 in 1913. It may also be noted that the balance of the Drinkhouse property, parcel 182, all watershed, was sold to the plaintiff in 1907 for about \$102 an acre. It seems to show a considerable excess of value in reservoir over watershed land, as shown in these two transactions. I have not deemed it necessary to figure the ratio, but it corroborates Mr. Grunsky's opinion.

The city of San Francisco, in 1908, bought from one Smith and from Kellett and Covell lands in and near the Hetch-Hetchy Valley, in the Yosemite National Park, then recently created. The Smith lands cost \$114 per acre, the Kellett-Covell lands \$109 per acre. Both comprised "inside" and "outside" lands so-called, meaning thereby lands in the proposed reservoir and lands outside the flow line. These purchases did not completely secure the entire reservoir; there was still left portions that were government land (Map Exhibit 129). By the so-called Garfield permit, the city was allowed these government lands in return for an [77] equivalent area of other lands, outside the reservoir and within the park, to be surrendered to the United States. It was their availability for this exchange that made the "outside lands" a desirable purchase.

for the city. The plaintiff has sought to draw from this purchase a ratio of reservoir to watershed. Of course from the city's point of view, if the outside lands were not of acreage in excess of the exchangeable acreage sought in the valley itself, the outside lands were as valuable *to the city* as the inside lands, since they could be exchanged. But they did not have any but an agricultural value to the former owners, or any one else. Mr. Jones, assistant city engineer, values the outside lands at \$25 per acre (6428, 6430) in part, \$50 per acre, in part (6431); and again he speaks of \$10 as an upper limit (6455). I think we may say that, apart from their particular value to San Francisco, the latter figure liberally represents the value of this land in the open market in 1908. It was wild mountain land in the heart of the High Sierras, coexisting with plenty of government land showing lack of previous public demand for it. I see no good reason to attempt to calculate a ratio between the values of reservoir and watershed land involved in this purchase; it would not necessarily apply to the lands here under appraisal. The city contends that advantage was taken of its necessities by the owners of the lands it desired and needed. That is of course possible, but I know of no evidence or method to determine the fact. I draw from the Hetch-Hetchy transaction these inferences: that special availability of land for reservoir purposes will in given cases be reflected in an increased market value; that values of \$109 and \$114 per acre for reservoir and watershed lands combined, [78] situated in the high mountains 200 miles from San Francisco, suggest no incongruity in values of reservoirs on the peninsula at \$1000 or even \$1400 an acre; that Mr. Dillman is plainly wrong when he says that "the value of land for reservoir purposes * * * very closely approximates its value for other uses" (6497).

I conclude therefore that we may reasonably start with the assumption that the peninsular reservoir lands were, in 1903, worth \$1000 per acre, Judge Farrington's figure. Have they appreciated in value in the succeeding ten-year period, and, if so, at what rate? It is clear to me that an appreciation has occurred. The importance of these reservoirs and the increasing demand for them, the increase in value of lands of an agricultural character throughout the state and the especially marked increase in San Mateo County, all indicate in a broad way that they may be considered as appreciating in value during the decade. The parties have conceded an increase in the value of watershed lands during the period 1907-15.

It does not follow, however, that the company can expect or that the community must face, a continuous appreciation in the value of these reservoirs and their watersheds. This is indicated by Mr. Hazen in his final summing-up (8390). In his estimates he used the appraisals of the company's witnesses for lands and water rights, including therefore those of Baldwin and Hoag, which I have modified to lower figures, and of Grunsky, now under consideration. Upon such bases he says:

"It seems to me that the value of the lands in the Peninsula works and the rights as they have been valued in this case have reached the point where the system as a waterworks property is valued for about all the market will stand. I should say that if [79] the lands, for instance, doubled in value in view of the general situation, as a waterworks property the price taken into the rating base ought not to go up in proportion, that is, in view of the cheaper water from Alameda and the possibility of other water being brought into the market."

I do not attempt to forecast the limit of such values; as Hazen states, it is largely a question of preserving a consistent balance between the costs of various existing sources (8387 *seq.*, *supra*, p. —).

It is not easy to determine the rate of increase that we should here adopt. If, starting at \$1000 as a base in 1903, we take Dillman's increase at 5% simple interest rate annually, the indicated value for 1913 is \$1500 per acre; and if we use his rate of 3%, compounded each year, the indicated value for 1913 is \$1345. If we take Grunsky's rate of 5% compounded, the indicated value for 1913 is \$1625 per acre. The census and assessor's figures collated by Mr. Grunsky show a marked increase in population and general values in this period. The assessed value of San Mateo County real estate of all kinds, excluding improvements, increased from \$9,970,000 in 1903 to \$19,600,000 in 1913, nearly 100% in the decade (1243). In the decade 1900-10, the average yearly increases of population and assessed value in San Mateo County were 8.2% and 7.5% respectively (1244). The 1910 census shows that farm land and buildings in San Mateo County increased 105% since the previous census, an average annual increase of 7.5% (1246). Population of California as a whole increased 60.1% between 1900 and 1910, or at an average rate of 4.9% (1250); and California farm lands (without buildings) increased 109% in the decade or at the average rate of 7.7% (1251).

[80] We may conclude that Mr. Grunsky's appraisal of \$1400 was adopted by him in a fair and conservative spirit, and I would not find it difficult to justify to myself the acceptance of his appraisal. It is to be noted, however, that in the matter of adjusting watershed values among the various years here in controversy, the parties have themselves stipulated a more moderate rate of appreciation, viz., 100% for 1912-13, 1913-14 and 1914-15, 95% for 1911-12, 90% for 1910-11 and 85% for 1907-8, 1908-9 and 1909-10 (1187). And this stipulation was expressly extended to reservoir lands (1188). There is lacking any stipulation concerning the years between 1903 and 1907, but the statistics noted show an appreciation, and in the spirit of the stipulation, it is fair to say that during the four years 1903-6, the values of the reservoir lands remained the same at \$1000 per acre, and that this value was 80% of the 1913 value. The resulting values would be: 1903-6, 80%, \$1000; 1907-10, 85%, \$1062.50; 1910-11, 90%, \$1125; 1911-12, 95%, \$1187.50 and 1912-15, 100%, \$1250.

I believe such figures should be regarded as fair and conservative; that they make allowance for possible over-estimate by Mr. Grunsky, or possible error on his part in fundamental assumptions; and, on the other hand, considering the very moderate rate of appreciation adopted, that they make allowance even for possible error by Judge Farrington.

Mr. Grunsky also valued at \$700 per acre 640 acres of land at Crystal Springs, not yet under water, which will be flooded when the dam is raised to its ultimate height. In strict logic, his position is right, since its market value would be affected [81] favorably by this special adaptability. I have already included it in the appraisal of watershed lands and at watershed prices, much less than \$700 per acre. The record does not to my knowledge show this acreage according to parcels, and I know no method of ascertaining the amount for which it has been already appraised. So also, though neither party has pressed it upon my attention, the acreage flooded must have been less prior to the raising of the Crystal Springs dam in 1911. So far as I know, the record does not show this amount, and obviously, it has not been covered by the watershed appraisals already made. Without attempting a strictly consistent treatment, but on broad grounds, considering also my treatment of the Calaveras lands hereafter, I shall leave the watershed and reservoir acreages at the same figures throughout the years in controversy.

We have, then, the following acreages:

Crystal Spring,	1483
San Andreas,	498
Pilarcitos,	109

2090 acres; and the following

values for the different years:

1907-8	}	2090 acres at	\$1062.50	\$2,220,625.
1908-9				
1909-10				
1910-11	}	“ “ at	\$1125	\$2,351,250.
1911-12				
1912-13	}	“ “ at	\$1187.50	\$2,481,875.
1913-14				
1914-15				

Calaveras, San Antonio and Arroyo Valle

The reservoirs at San Antonio and Arroyo Valle have not been built, and it is not certain when they will go into use as reservoirs. Mr. Grunsky [82] fixed their market value at 125% of the appraisal for agricultural uses; Mr. Cory at one-third more. On plaintiff's figures alone, the additional amount involved is from \$8000 to \$12,000 for San Antonio, and from \$4000 to \$5000 for Arroyo Valle. These amounts are too small to make the question critical or deserving of discussion. I make no addition to the valuation already found, treating the reservoirs as watershed only, as they are now used.

Calaveras reservoir presents a problem involving larger amounts. I have hitherto presented my appraisement of this property without any reference to its special availability for reservoir purposes, but for ordinary uses; I have made no segregation of the value on that basis of the land below the flow-line. Mr. Gale has done so (Exhibit 29), and finds a value of the reservoir land alone, for agricultural uses, at \$188,525. Mr. Grunsky's valuation for all uses, including reservoir use, is \$386,000; Mr. Cory's \$600,000. In 1913, work had been begun on the dam; it is not yet finished. Mr. Grunsky's reasons for a valuation at \$200 per acre are given very clearly and with much force at pages 1233-34 of the record; Mr. Cory's, likewise with considerable weight at pages 1350 and following. If this were a sale or a condemnation, as of 1913, I should adopt a figure at least equal to Mr. Grunsky's. The question is whether it is to be valued, in rate-fixing proceedings, with refer-

ence to its actual use as watershed, or with reference to its potential and approaching use as reservoir. In the 1903 case, Judge Farrington discussed this matter and valued the land as watershed only. (192 Fed. 157 *seq.*) I quote (pp. 159-160):

[83] "While the company should be in advance of the present demand, and provide for emergencies, for growing population, for unusual droughts, and for extraordinary conflagrations, it should not be too far in advance. If property is to be included in a valuation for rate-fixing purposes, it must be shown to be either presently useful, or to be necessary for wants which are near at hand. If the rule were otherwise, the public might be called on to bear the burden of the company's investments, in addition to paying a reasonable price for the company's service. The courts are always open. Such lands can always be condemned, and reservoirs constructed and connected with the system, within a reasonably limited time before they are needed. * * * When in the future reservoirs are constructed and in use, the lands will be valued for rate-fixing purposes at their full value, the value at which they could be acquired at that time in condemnation suits. * * * I cannot recede from the position taken in the 1908 case: If the company voluntarily devotes to the mere catchment of water lands which are much more valuable for other purposes, it is unreasonable, in fixing rates, to appraise such lands for more than they are worth as watershed areas. *Spring Valley Water Co. v. San Francisco*, 165 Fed 667, 698."

It is true that the court was speaking of 1903; whereas during the years here in question, the work of building the Calaveras dam had actively begun (1233). It is also likely that if this plaintiff had not already acquired this land, the condemnation referred to in the opinion might have been impossible; the land would likely have been acquired by the water company serving the east side of the bay, or by the city. And in any event, the condemnation would have to be begun some time before the beginning of construction and many years before final utilization of the reservoir, as events have proved. In such a proceeding, assuming it possible, the award would recognize special availability, as indicated by the probable presence of at least three competitors for the site. To be logically consistent, it may be I should adopt a certain year during this period at and after which [84] the Calaveras reservoir lands should be taken into the rating base at their full market

value. Perhaps inconsistently, but as a measure of compromise upon various considerations, I have concluded to follow the Farrington rule for these cases, and accord with the city in this question; but I shall not follow the city in excluding the watershed value already found, but shall take all this land into the final rating base, as Judge Farrington did.

Summary

There will thus be added to the landed capital entitled to return in the rates, the value of the peninsular reservoirs as found, and the value of the Merced lakes, \$336,000, the total sums being as follows:

1907-08	\$2,556,625.
1908-09	
1909-10	
1910-11	2,687,250.
1911-12	2,817,875.
1912-13	2,948,500.
1913-14	
1914-15	

[85]

WATER RIGHTS

The valuation of the plaintiff's water rights is considered by counsel for both parties the most difficult single subject in this litigation. In consequence of this, perhaps, the record of testimony and the arguments are unusually long and complex. At the expense of much time and labor, I have carefully considered every point made by witnesses or counsel, though I shall not pursue the subject into all its details in this report. There is little or nothing in the way of decided cases to afford a guide to the principles of such a valuation. There is some uncertainty and room for debate as to the proper measure of the water right, and as to the value of the unit of measurement. One must be careful to avoid assigning a value to that which may be elsewhere duplicated in the complete appraisal. The situation is thus one that demands, and I trust may seem to have been given, a conservative treatment as to all estimates herein made. What follows represents a solution which after long consideration seems to me quite clear. I have found it necessary, in consequence of the situation at Pleasanton, to depart from the practice thus far pursued in this report, in that I will here pass on the question whether the Pleasanton ranch lands shall be included in the capital basis of return.

The valuations offered are by competent hydraulic engineers. Taking the year 1913 for an example, they are, Mr. George G. Anderson, \$4,240,000, Mr. F. C. Herrmann, \$4,300,000, these being for plaintiff, and by Mr. Charles H. Lee, for the defendants, \$1,932,988.82. The company's engineers agree that the principle of valuation is the market value in the vicinity of the rights to divert, in millions of gallons daily of supply, and likewise [86] agree that the value of that unit was \$100,000 per million gallons daily (hereinafter, for brevity, written M. G. D.). They agree approximately on the extent of the diversion right in millions of gallons daily. Herrmann (Exhibit 173) finds this as the sum of the following: for the peninsular system, the "safe dependable yield," or 19.5 M. G. D., for Merced, "the average daily draft" from 1907 to 1915, or 3.4 M. G. D., and for the Alameda system, "the maximum average daily draft sustained for one month for each of the years in question prior to 1913, and the Alameda pipe line capacity of about 21 M. G. D. since and including 1913." The total is thus 43.9 M. G. D., from which Herrmann deducts 900,000 g. p. d., the approximate amount supplied consumers outside San Francisco. Of Mr. Lee's figure of \$1,933,000, the sum of \$1,830,000 represents his estimate of the water company's actual expenditures throughout its history in the acquisition of rights to divert water, other than by pumping at Pleasanton, and \$103,000 as the proper (though not the actual) cost of the latter supply. As to the Pleasanton source of supply, the position of the city and its witness is: first, that the lands south of the Arroyo Valle stream, the so-called well-tracts, are proper capital assets, used and useful for water development structures and operations, and are not a charge against water rights, even though they command, to an extent, the right to withdraw water from the underlying gravels; second, that the lands north of the Arroyo Valle, the so-called Pleasanton ranch lands, which have no water structures and which were bought in 1911 and are now used solely to avoid injunctions against lowering the underlying water table by the pumping upon the well-tracts to the south, represent an extravagant and abnormal [87] charge against water-rights; that the company should either have secured the rights to lower the water by condemnation, in which event the proper damages to be awarded would have been, according to Lee, \$103,000, the capitalized cost of the increased expense of pumping by the owners of the ranch lands, or that, in the alternative, the company having bought the lands outright, could and should have immedi-

ately resold them with a reservation of the water-rights, at cost less the damage by the reservation, or \$103,000. The total actual cost of \$1,933,000 thus obtained, Lee identifies with present value, a conclusion which will be discussed later. Assuming, however, that past cost is equivalent to present value, and assuming also that the full extent of the present yield of the rights was actually bought and paid for, then the measure of the yield could be determined, in million gallons daily, and the quotient of \$1,933,000 by this figure would give the unit of value per M. G. D. Mr. Lee, however, expressly disclaims ability, by reason of the inherent limitations of his historical cost method, to determine the present value of a water-right in a unit per million gallons daily. He has, however, determined the measure of the yield as 35.8 M. G. D., and thus obtains a figure of about \$54,000 per M. G. D. not as market value, but as his idea of a fair allowance for rate-fixing purposes (9729). To obtain 35.8 M. G. D. as the measure of the yield, he adds, (1) for Merced, the average daily draft for the period 1907-15, 3.4 M. G. D., (2) for the peninsula, something more than an average thus determined, namely, 19 M. G. D. and (3) for the Alameda system, including Pleasanton pumped supply, the average daily draft through the Alameda pipe-line for the period 1907-15, [88] less 5% for slippage at the Belmont pumps, namely, 14 M. G. D., making a combined total of 36.4 M. G. D. from which he subtracts 600,000 g. p. d., for consumption outside San Francisco.

The reason why Mr. Lee cannot say that his ascertained cost of \$1,830,000 (Pleasanton omitted) represents cost or present value of the full yield of 35.8 M. G. D. is plain from the historical facts. This sum represents, in the main, expenditures for the extinguishment of rights of others in the streams, and chiefly of riparian owners, grantors to the plaintiff. But the facts of history show that plaintiff's rights of diversion to a large share of the total, arose by prescriptive title, through use adverse to riparian owners. These rights cost nothing. And further, since the law has of late become established in California that a riparian owner cannot prevent an appropriator above him from diverting waters that the riparian owner cannot and will not be able to utilize, sometimes called extraordinary or flood waters, it has become evident that a considerable portion of plaintiff's water-rights are rights which not only cost nothing historically, but would cost nothing in a mental process of appraisal by the reproduction method. They arise as rights of property against the world when the lands and structures

necessary to divert are built and the appropriation is complete; and if the lands and structures are otherwise allowed in an appraisal, the net value of the right of appropriation, if value there is, arises by the *act* of diverting. At this point is the chief divergence of the parties in matters of law. The company's view is that in addition to its lands useful for the collection and storage and for the protection of the water, and the structures necessary to impound and divert it, there exists and must be allowed in the appraisal, an additional property, [89] the right to divert water from the stream, to be measured in value by its worth in the market. Their contention is explicit that it is indifferent as regards value whether such rights cost anything; and it is implicit that it is indifferent whether they could not possibly cost anything beyond the land and structures, as in the case of waste waters. The city's contention is, that as to waste waters, they are valued when lands and structures are valued; that as to waters the right to which is obtained by prescription, that right was merged when riparian rights and lower riparian lands were purchased, and is taken care of when riparian rights and the lower lands are allowed in the appraisal; and as to rights exercised by release for value of riparian rights, that cost is the best index of present value. As to waste waters, Mr. Searls says (Arg., p. 1859):

“It follows that this right to take and divert extraordinary flood waters is a mere incident of the ownership of the land, and is not entitled to a separate valuation in addition to the appraisal of that land.”

In this and in other respects the city's counsel is in my view resting under a fundamental misapprehension of the law. Accordingly it seems wise at this point to state the law of California as to rights of appropriation and riparian rights; and in doing so I shall not attempt completeness nor anything more than an incidental citation of authorities—that burden may be taken by counsel if need arises.

It is hardly necessary to say, except by way of introduction, that in the western states of this country, the characteristic water law is the law of appropriation. In Colorado and other states it is the sole law appertaining to the diversion of running [90] water; in California and states following its lead, it co-exists with the law of riparian rights derived from the common law of England. It originated in California as customary law following the close of the Mexican war and the discovery of gold in 1848. The pioneers

who poured into the new land in vast numbers found neither an organized government nor a system of laws, but land, gold, waters and the other resources of nature in abundance, generally unappropriated to private uses but all part of the public domain of the United States. It was inevitable that the proprietary rights of a distant government should not be regarded or permitted to balk the purpose of long journeys and the endurance of great hardships. The gold was deemed his who first discovered and mined it from the ground; and in like manner, the land, timber and waters needed to work the gold deposits were claimed and used, "appropriated," and right to continued possession recognized while the need existed. The first in time was the first in right. Communities dominated by American stock would naturally not long endure the absence of local governments and laws; mining districts were formed, and necessary rules and regulations passed in miners' meetings. These local customary laws as to mines and waters were later recognized and applied by courts and still later by statutes. In the Act of 1866, and in 1872, R. S. 2322, 2339, Congress recognized the "possessory rights" upon the public domain for mines and for water diversions with their necessary rights of way, where valid according to local customs, laws and the decisions of courts; and subsequent grants by the government of the fee in the form of patents, were expressly subject to these possessory rights.

[91] Arising simultaneously, the rules for the appropriation of mines and of waters seem to have been similar in substance, as they were similar in basic legal idea. (See, for example, Civil Code, Cal., sec. 1410 *seq.*, substantially the same when first passed in 1872 as at present.) The first discoverer or appropriator was first in right. Neither miner nor appropriator has ever needed legal title to the fee of the land, where that rested in the government. The right in each case was initiated by taking possession, evidenced in part by posting a notice of "claim" on the ground. The claim must in one case describe the boundaries of the mine, in the other the number of miner's inches of water to be diverted, the size of the conduit, the purpose of diversion and the place of intended use. The miner, if his acts of claimed possession antedate his discovery of mineral, must prosecute work diligently toward that discovery to be protected in his right of possession; the appropriator must use diligence to complete the diversion in order to possess the right to do so. The appropriator's right may be terminated if he ceases to use it for a beneficial purpose; the locator of an unpatented mine

must perform one hundred dollars worth of work upon it annually—as statutory evidence of continued possession for a beneficial use. The miner's right is to destroy the mine by removal of the mineral; the appropriator may destroy the stream as such by diverting it beyond the watershed.

I have made this comparison of the miner's right and the appropriator's right, not as a matter of academic interest, but in the view that we may better understand the appropriation right in contrast to the riparian right, and may also perceive what I have called fundamental errors in the city's position.

[92] And first as to the contention that the appropriator's right to divert "extraordinary flood waters is a mere incident of the ownership of land, and is not entitled to a separate valuation in addition to that land." It has been seen that historically and in its essential characteristics, the appropriator's right, like the miner's, has nothing to do with the ownership of land. Where either water or gold is the subject of appropriation at all, it is because it is *publici juris*, open to the first taker. On the public domain or where access to the stream and right of way for the conduit is permitted, no ownership of the fee is requisite to the right. The purchase of dam-sites, of reservoir areas, of rights of way, is due to the passing of lands into private ownership, and to the operation of the elementary legal principle that no legal right (including the right of appropriation) can arise in derogation of prior vested rights, save by prescription.

The next fundamental error of the city is in the assumption that value cannot be assigned to a right of property, additional to that of the land and structures which its exercise requires, where it cost nothing as a historical fact, and could not be made the subject of any expenditure in the method of finding present value by a hypothetical reproductive process. Such is, in essence, and often in fact, the right to appropriate water. I have been especially struck with this peculiarity of this right of property, because I have never seen anything like it among the various rights of property or elements of value that usually enter into the properties of a public utility subject to appraisal. Usually the elements of value have been the result of expenditure, [93] and would cost money to reproduce; or if they cost nothing, as by gift or by adverse user, would be the subject of estimated cost in the reproductive method. Here in any view, the right arises by the act of diversion. Like the miner's right, it is a valuable right conferred by the United States,

and in the case of water by the state also, to him who finds and takes. And just as the miner has in his mining claim, after discovery and location, a property which may possess value in exchange far beyond his expenditure of labor and money thereon, so the appropriator has in his right of diversion, a right separate from his rights in lands and structures, and which may in a given case have a sale value far beyond his expended costs. And in the normal case, the value upon which rates can be earned is the exchange value in the market.

By the common law, the owner of land on the banks of a stream was entitled to a continuance of its flow *ut currere solebat*, undiminished in quantity and in quality, except for losses by proper riparian use above him, and to use it for the reasonable needs of his riparian land within the watershed. On April 13, 1850, the legislature of California passed an act reading:

“The common law of England, so far as it is not repugnant to or inconsistent with the Constitution of the United States, or the Constitution or laws of the state of California, shall be the rule of decision in all the courts of this state.” (Stats. 1850, p. 219; re-enacted in 1872, Pol. Code, sec. 4468.)

It may be doubted whether by the intention of the legislators of that early day, or by the language employed, the riparian law was established along with the antithetic existing water system [94] of appropriation. We need not follow the history of this question as to the existence of the riparian rule in this state through the years; it was established as law in the common law form of statement, by a divided court, in the great case of *Lux v. Haggin*, 69 Cal. 255, decided in 1886. It is still the law, and the riparian right in private hands is paramount over the right of appropriation, save where that vested earlier in time; but in substantial respects it has undergone extension and modification since *Lux v. Haggin*, changes prompted by the prime necessity of the full utilization of all the water resources of an arid or semi-arid region.

The riparian rule has been extended in its essence from its application to surface streams to underground gravel supplies (*Katz v. Walkinshaw*, 141 Cal. 116, decided 1903); and, as against an appropriator from a stream, to the owner of non-riparian land overlying gravel supplies fed by that stream (*Miller v. Bay Cities Water Co.*, 1910, 157 Cal. 256).

The modification of the riparian rule has been to restrict the right to limits defined by actual or possible beneficial uses upon the riparian land. In *Gould v. Eaton*, 1897, 117 Cal. 539, 543, appropriation and diversion above a riparian owner was enjoined, the court saying:

“The plaintiff’s right to an injunction does not depend upon the amount of injury which he has received. Being a riparian owner, he has a right to the flow of the entire stream as against any diminution thereof by one who is not a riparian owner, and the claim of the defendants that they have a right to divert a portion of its flow authorizes him to invoke the aid of equity in order that this claim may not ripen into a right.”

[95] It would seem from later decisions that the court correctly held that past or present actual damage is not prerequisite to the injunction, and that it will issue to block a prescriptive right where beneficial use on the riparian land is possible, though not actual; but that so much of the language as implies that the riparian owner has the common law right to have the stream flow by irrespective of beneficial user, is erroneous. Thus the court said in *San Joaquin etc. Co. v. Fresno Flume Co.*, 1910, 158 Cal. 631:

“If the doctrine announced in *Gould v. Eaton* may be thought to confer upon a riparian proprietor greater rights than these, namely, the right to have all the water of the stream at all times flow past his land, without regard to the question as to whether or not any diminution does or could injure him, then it must be said that the doctrine of *Gould v. Eaton* is to this extent modified by the later decisions. Of course, the riparian proprietor’s rights are not measured by the amount of water which he is actually using at the time of his action. In this sense the actual present damage ceases to be of great consequence, but its place is taken by the necessary and consequential damage which would follow to his land if the unauthorized act of the upper appropriator were allowed to ripen into prescriptive right.”

The rule was well stated in *Miller and Lux v. Madera Canal Co.*, 1909, 155 Cal. 59, 64, as follows:

“As against an appropriator who seeks to divert water to non-riparian lands, the riparian owner is entitled to restrain any diversion which will deprive him of the cus-

tomary flow which is or *may be* beneficial to his land.”
(Italics mine.)

It is in connection with this principle of beneficial user as the test and limit of the riparian right that there has arisen the doctrine of waste waters. In the testimony and the briefs in this case, and, it must be said, in the decisions of the [96] Supreme Court of this state, there has been an unfortunate and misleading use of descriptive terms. To point the contrast between the water which is the object of the riparian right and the water which may be taken by a subsequent appropriator, we find in contrasting employment, such terms applied to the flow as “ordinary” and “extraordinary”, “normal” and “abnormal”, “summer” and “winter”, “low” and “flood”, or “freshet” waters. In this state and in others of similar climate, where there is a wet season and a dry season in each year, and where the rainfall varies in succeeding winters, any term of description founded on seasonal changes or quantity of water in the stream loses its force as applicable to rights in streams. In all our streams there are flood periods, and in some, they alternate between freshets in winter and a dry bed in summer. Not only is the flood thus the normal flow, but it is apparent that it would be impracticable to draw any line, based on quantity, between flood and extraordinary flood. The true distinction is between what the riparian land can use beneficially, which may extend conceivably to the highest point of flood, and what the land can not use to advantage, which, conceivably, may be all the flow, or practically so. I shall use the term “waste waters”, following several of the decisions. There are several cases where the riparian right has been extended to the flood flow. In the *Madera Canal Co. case*, 155 Cal. 59, the granting of a temporary injunction against an appropriator of flood waters was affirmed, in favor of a riparian proprietor who used the high water to fertilize with the silt and to irrigate his low-lying meadow lands along the river. In the *Bay Cities Water Co. case*, 157 Cal. 256, [97] an appropriation of the freshet flow of Coyote creek, near San Jose, was enjoined, at the suit of a landowner whose lands were remote from the stream, but overlying the ancient gravel delta of the river, which by percolation fed and maintained a subterranean water supply; and the riparian right was held to extend to the beneficial service which under the physical facts of that stream could only be performed by the freshet flow, viz., by the pressure of “their great breadth and enormous weight” at the

gravel outcrop, to supply and keep at a fixed level plaintiff's wells penetrating the artesian strata. On the other hand, in *Fifield v. Spring Valley Water Works*, 130 Cal. 562; *San Joaquin Co. v. Fresno Flume Co.*, 158 Cal. 626, and *Gallatin v. Corning Irrigation Co.*, 163 Cal. 405, the appropriation was sustained because the riparian proprietor was not injured, the facts showing that the water in question was waste water, and therefore open to the appropriator's diversion.

The review of the cases as to waste waters suggests this further observation. When the decisions I have referred to characterized the waters there in question as waste waters, they did not necessarily establish the right of appropriation as a complete right on the stream, but only against the particular plaintiff; for what is waste and useless as to one riparian proprietor may perform useful and necessary service upon the land of his neighbor. Therefore the decisions correctly announce that each such case must rest upon its own facts.

But cases like the present, involving the question of rates affording a just return on property employed, are quite different. The water rights of a water company are property, and complete and valid against the world—else we do not value them. They [98] are rights of appropriation and diversion away from the stream and its watershed, for otherwise they would be useless for the purpose of their ownership; and if, as here, the company owns riparian rights by virtue of necessary ownership of riparian lands, they do not interest us, for such must be used on the riparian land. When counsel speak of a valuation here of riparian rights appertaining to land not owned by the plaintiff below the points of diversion, they refer to actual or possible costs incident to release of rights to object to the appropriation,—the only right with which we are concerned. Now, then, the question before us is, what are those rights of appropriation worth? What would they sell for? What should they be valued at in a rate-fixing controversy?

I have reviewed the law of this state underlying the anomalous situation arising from the existence of two radically inconsistent systems of water law as a basis for concluding that in valuing a right founded on appropriation we will reach correct and consistent results if we disregard all attempted distinctions drawn from controversies between riparian proprietors and appropriators; in other words, value the right as if the riparian law had never been

in effect. Is it to be supposed, in reason, that a valid right of appropriation anywhere in this state is now worth either more or less than it would have been worth if the riparian right had never existed? Is a right to divert worth more where it was perfected by buying off a dozen riparian owners than it would be if only one could have objected? Given the same quantity and the same cost of diversion works on three streams in contiguous [99] watersheds, would there be in reason any difference in worth between the right to divert on a stream where all the riparian land was public domain, the right on a stream where riparian rights had been barred by prescription, and the right on the third stream where releases from riparian owners had necessarily been purchased? I am clear that all these questions must be answered in the negative. The value in each case is the market value, and is dependent upon the demand.

Our problem then is to find from the evidence the market value of the appropriation right for domestic water supply in the vicinity of the bay of San Francisco. There are but a few cases that bear on the subject at all.

The well-known case of *San Joaquin and King's River Canal and Irrigation Co. v. Stanislaus County*, 233 U. S. 454 (1913), was an appeal from the Circuit Court of this district in a rate-fixing case. Justice Holmes, for the court, said:

“The question before the court has been narrowed to a single issue. If the plaintiff is entitled to 6 per cent upon its tangible property it is agreed that the order must stand. But if the plaintiff has water rights that are to be taken into account, the rates fixed will fall short of giving it what it is entitled to and must be set aside. The circuit court dismissed the bill (191 Fed. 875), and on this appeal figures are immaterial, the only question being whether the principle adopted is right. * * * It is not disputed that the plaintiff has a right as against riparian proprietors to withdraw the water that it distributes through its canals. Whether the right was paid for, as the plaintiff says, or not, it has been confirmed by prescription and is now beyond attack. * * * We are not called upon to decide what the rate shall be, or even the principle by which it shall be measured.”

The court also disapproved the view of the lower court that water appropriated for sale is the property of the consumers.

[100] It is thus decided that the appraisal must extend to the

right to divert as well as to the lands and structures instrumental in the diversion and distribution. True, no reference was made to the question of waste waters; and so the city in denying the right of appraisal to such waters, is within the letter of the decision, since an allowance is conceded to the extent of expenditures for the extinguishment of riparian rights. Apparently the question of waste waters was not presented. But the reason of the decision extends to the entire quantity to which the right attaches; what the court emphasizes is ownership of the right, and it regards as immaterial the question of expenditures for the right. And it may be remarked that the right to appropriate waste water is, in a real sense, a right against the riparian proprietor as well as the world generally, since all question as to its character as waste is settled by the concession of the rightfulness of the diversion.

In the prior case between these parties, *Spring Valley Water Works v. San Francisco*, 192 Fed. 162, Judge Farrington referred to the fact that valuations submitted ranged from \$40,000 to \$150,000 per million gallons of daily delivery, and found a value for the year 1903-04 of approximately \$63,600 per M. G. D. average delivery. The opinion contains little discussion, and does not disclose the court's reasoning. After contrasting the higher operating costs, due to pumping, attending the utilization of the Alameda and Merced rights, with the lower operating costs of the Peninsular supplies, and after referring to the fact that rights which required ownership of high-priced lands and costly structures [101] as in the case of the Alameda and Peninsular supplies, were less valuable than rights would be if diversion could be accomplished by a simple dam, and delivery made by gravity, he evidently concluded that the rights throughout the system could be valued at a uniform unit of value. The judge says:

“The average daily amount of water used in San Francisco in 1903-04 was about 33,000,000 gallons. During the summer months there were days when the consumption was much higher. For the water rights used in supplying San Francisco, considering all the circumstances, \$2,100,000 seems a very liberal allowance.”

It is to be noted that the total value, and the resulting value per M. G. D., was referred to the average yearly delivery, and not to the extent of the water-right—the allowable diversion at any time as against others.

In *Murray v. Public Utilities Commission* (1915), 150 Pac. 47, 50; 27 Idaho 603, the Supreme Court of Idaho said:

“The Supreme Court of the United States, in *San Joaquin etc. Co. v. Stanislaus County*, *supra*, does not state any rules for ascertaining the value of such a water right. The value to be considered by the commission is the present fair value of the water right at the time the rate is fixed. The original cost is not at all conclusive, if it can be shown that it now has a different value, although the original cost is, as in all cases, an element which may be considered. The present fair value should be determined by the best evidence of which the nature of the case is susceptible. It should be measured by the fair market value of a similar water right in the locality, or a similar locality, if such can be established by satisfactory evidence. If no market value can be established, then the opinion of competent witnesses as to the actual value may be considered. In this respect the case does not present any exceptional features. The same rule is applied in the case of any property, real or personal. The fair market value is the usual standard; but, if it be shown that the property has no market value, then witnesses may testify to actual value, which is, of course, largely a matter of opinion. Because it is difficult to [102] determine the exact value of a certain kind of property, it does not follow that the owner shall be refused the protection of the law. * * *

We suggest that the expert engineers employed by the commission, as well as those testifying for the parties, may render great assistance to the commission in deciding these questions in each case.”

It is submitted that this is an excellent and a correct statement of the law.

I hold that the fair market value of plaintiff's rights of diversion, as a whole, during the respective years here in question, is the proper standard of valuation for rate-fixing purposes; that the extent of the right is to be measured by the extent of its utilization, that is, the average yearly supply to San Francisco in any year, less the amount derived from the Pleasanton source; that the Pleasanton supply is properly included by an allowance, in the capital value, of the market value of the Pleasanton lands as a whole.

In justifying these conclusions, I shall first endeavor to find the market value of a water-right in the vicinity of San Francisco bay

during the times during which these eight ordinances were to be effective. The evidence is not abundant; in fact, as regards the usual standard of comparable sales, it is meager; but there is enough to point with fair definiteness to a reasonable conclusion. Here as elsewhere, I have required the expert witnesses to give their reasons for their opinions, and I have weighed those opinions in the light of the strength or weakness of the reasoning processes by which the conclusions were reached. Practically the only evidence of market value of these rights is that of the plaintiff's witnesses, Anderson and Herrmann, [103] and I would be justified in accepting their valuation of \$100,000 per M. G. D. I have adopted a lower figure after full consideration. And it should be said that while I approve their methods as a whole, I do not agree with their views in detail.

The appraisal of Mr. Lee, the defendant's witness, at \$1,933,000, or \$1,830,000 excluding the Pleasanton supply, represents original investment in water-rights, and only remotely touches the market value. Lee states that the practice of the Railroad Commission of this state has been to determine the valuation of water-rights for rate-fixing purposes at the figures of actual cost of the right; and he concludes that this rule, enunciated by so important and respectable a state agency, cannot but have influence in crystallizing the opinions of persons buying and selling water-rights in the market. There is some force in this view, whether or not the rule of valuation referred to is legally justified or not. Its force is weakened when we consider that the commission, with its general powers over public utility valuations, has only been in existence since 1911, after the majority of these suits were begun; that no concrete instances of the influence of this doctrine have been observed; and finally, by the fact that the rule, if it ever existed as such, has apparently been disapproved by the commission itself. (*Re Marin Municipal Water District*, decision No. 2279, p. 19, April 9, 1915, per Thelen, C.) This slender thread is the only connection that exists between Lee's figure and present market value.

The chief reasons, apparently, that prompted Mr. Lee to approve original cost as a proper equivalent for present value were: [104] first, that his studies by alternative methods, namely, by reproduction cost and by comparative sales, gave him unsatisfactory results and indicated figures less than the rights cost; second, that, independent of the question of value, it was fair to company and consumer alike to rate returns on actual investment. Mr. Lee

shows himself in his evidence to be an accomplished hydraulic engineer, and his hydraulic studies and estimates of cost are valuable; but he should have stopped there, and left the justification of the adoption of original costs for present value in a rate-fixing case, as a question of law and economics, to the city's counsel to struggle with as best he could. For this latter task Mr. Lee was not fitted, either by professional experience or, apparently, by any course of reading or careful thinking. The truth is, he attempted to defend an impossible position, and involved himself upon cross-examination in a series of contradictions and inconsistencies, in a way that must have been painful to the witness but was most valuable to me in demonstrating the untenability of the cost theory. I shall not go into this matter at length. Lee's costs, which cover, in the main, payments for release of riparian rights, make no allowance for appreciation in values of water-rights since dates of purchase, nor for rights gained by prescription or by diversion of waste water, occurring both before and after purchases of riparian releases. The plaintiff's purchases of water-rights occurred long ago—at Merced (if water-right it was) in 1868; at Pilarcitos, about 1861 to 1871; on San Mateo creek, 1883 to about 1890; on Alameda creek, 1875, 1887-8, and a few later. Lee admits that values of water-rights have increased since 1888 (10089); it is plain that [105] there has also been an increase since the earlier periods. The witness considers, however, that the expenditures were extravagant to the extent of \$700,000 or \$800,000 for which no equivalent in value of water-rights was received, and this sum and a percentage addition of 5% made by him to cover costs of acquisition and omissions, he considers sufficient to cover any appreciation that may have occurred. As to this it may be remarked that it may be doubtful if one may at this later day determine with any certainty that an earlier purchase was at an extravagant price. And in the next place, this summary balancing of early deficiency in value received against later appreciation is open to the same objection that was made in the Minnesota Rate case against the master's balancing of appreciation of structures against their depreciation in value (230 U. S. 457). This is especially true when Mr. Lee finds himself unable to determine present market value for lack of evidence that satisfies him.

Mr. Lee's failure to find any figure for the market value of these water rights is due to the fact that his judgment rejects the only sales or valuations that throw any light on the problem.

He is thus forced to the value of the alternative use of the water in irrigation, which in this vicinity he finds to be \$8000 per M. G. D. This is like valuing a Swiss watch upon its utility as a kitchen timepiece. The only significance of the irrigation value is that it is a depressing influence in the competitive elements which form the market. But the needs for irrigation here are small in comparison with the supply of water for all purposes, and the value of the product does not warrant high prices for water. On the other hand, the needs for domestic water are [106] pressing ones in every community around the bay of San Francisco. Lee admits, as he must, that if the Alameda source were sold by the plaintiff to a company or municipality supplying the population on the east shore of the bay, a figure of \$8000 per M. G. D. would not be compensatory (9973).

So also Mr. Lee's studies on the basis of hypothetical reproduction cost of the water rights are made invalid by his underlying assumptions. For example, in his estimate as to Alameda creek (9669), deleting the Spring Valley Company's ownership for purposes of his working hypothesis, he assumes that the rights of diversion would either be owned and used for the domestic water supply of the east bay cities, or for irrigation on the Niles cone. And he says, since the plaintiff would not have the right of condemnation against another water company, "it could not reproduce the water right for use in supplying San Francisco." Having thus avoided the only question of interest, the worth of the right for domestic uses, by a process of transfer thereof to another water company, he concludes that the only measure of value by the reproduction method left to him is the value for irrigation uses. Obviously, though evidently not so to the witness, the premise and the conclusion are both fallacious. If we base our assumed facts upon what would historically be the situation if the plaintiff had not long owned these rights, then doubtless they would be owned by the other company or by San Francisco, and he need not have considered irrigation uses. But the same problem would logically be present—what are domestic water rights worth in the hands of the assumed owners? The logical assumption underlying a hypothetical reproduction by [107] condemnation would be that the water was devoted to private uses, here irrigation chiefly, but that the market demand was influenced by the competition of the Spring Valley Water Company, the company supplying Oakland and adjoining cities, and the city of San Francisco itself. In such

case, the compensation due to the irrigator would not be the loss of the value of its use to him in irrigation, as Lee erroneously assumes, although that is a factor, but rather the market value of the water for all possible uses, including domestic use. To value the water right at the value of the irrigation use is comparable to the valuation of the island in *Boom Co. v. Patterson* for agricultural purposes. The question has been fully discussed in connection with my consideration of the value of the reservoir lands, and the cases there cited apply.

What, then, was the market value of these water rights in the years 1907 to 1915? While the question is difficult to answer, a fair solution is by no means impossible. Messrs. Anderson and Herrmann lay considerable stress on statistics of water right values in Southern California. The irrigation rights, over and above value of lands and structures, of certain mutual water companies engaged in citrus culture are estimated by them to show an average net value, based on sales, of \$108,000 per M. G. D. The significance of these figures is emphasized because of the fact that the rates and consequent earnings of these companies are not regulated by public authority, and are therefore deemed to show economic values under free market conditions in a region where the demand for water is comparable to the demand here. Mr. Lee estimates these net water right values of companies exclusively [108] in citrus culture at \$90,700; others engaged in citrus culture and diversified farming at \$26,500; and those engaged in diversified farming only at \$13,080. The city accordingly argues that comparison should be made with the last-mentioned values, since citrus culture is impossible on a commercial scale in this vicinity. San Francisco suffers from many physical handicaps which increase the cost of its water supply, and it is certainly just that that cost shall not be further increased by a consideration of orange crops which the surrounding country cannot raise. But both parties have missed what seems to me is the only significance of these figures. They simply show (and for this purpose the highest figures noted are the ones to select), that if water, under free economic conditions, is worth \$100,000 per M. G. D. to raise fruit, such a figure for domestic supplies, even in this vicinity, is not beyond the bounds of *possible* figures; in other words, would not necessarily be an excessive figure upon which rates of earning could be predicated. But it does not follow that that is the present market value. As to Southern California, such statistics ought to indicate

that domestic water rights there are worth at least as much, and likely more, than these irrigation rights; for the domestic right is preferred in law, and, unlike the irrigation right, must concern water that is potable and constant in yield throughout the year. The evidence shows some figures for domestic water rights in Southern California in judicial or quasi-judicial proceedings, viz.—a judgment in condemnation by the city of Sierra Madre, in the Superior Court of Los Angeles, at \$270,760 per M. G. D.; California [109] Railroad Commission, Glendale case, at \$154,720 per M. G. D. These, however, concerned small amounts of water. I give these Southern California figures only a very general consideration, as having a remote and rather indirect bearing on the problem.

In like manner, figures of sales of irrigation rights in the San Joaquin valley and in the Sierras are of no particular interest. They depend on local conditions of supply and demand, and exhibit no uniformity of price. Mr. Herrmann gives particulars of some sales in the vicinity of Los Gatos which have some bearing; but the important ones were consummated too long ago to be of definite assistance, and the recent ones concerned very small quantities of water.

The evidence which seems to me of value as indicating a proper finding for the market value of these rights is:

- 1.—The opinion of Anderson and Herrmann, whose experience has been considerable and whose method of reasoning in general commends itself to me;
- 2.—The Livermore sale;
- 3.—The testimony of Mr. O'Shaughnessy;
- 4.—The finding of Judge Farrington as to the value of these water rights in 1903.

The Livermore Water and Power Company was, in 1912, engaged in distributing electricity to Livermore and Pleasanton, and water to the people of Livermore, towns on the border of the plaintiff's Alameda county sources of supply. Its chief water rights were rights to pump on a tract of 3 or 4 acres, from the gravels underlying a ranch of 377 acres. It also possessed water rights on Mocho Creek not fully developed, and not of much [110] value, because of danger of pollution (9996). We viewed the latter diversion on one of our inspection trips; it consisted of a small concrete dam, three or four feet high and about twelve feet long, according to my memory. The extent of the combined water rights was slightly less than one million gallons daily, of which the

pumped supply constituted about 900,000 g. p. d. In 1912 the property was sold to the Pacific Gas and Electric Company (9991). The testimony of Mr. Bissell, who owned the Livermore company, showed that the net water rights were valued on the company's balance sheet, and on a statement of assets submitted to the purchaser, at \$100,000 (9992). This value was challenged by the company's engineer (9993) and was reduced in the final settlement to \$85,000 (10030). The sale was submitted according to law to the Railroad Commission, and was approved. (2 Dec. 618, April 15, 1913, Eshleman, C.) There are no clearly defined findings by the commissioner, but certain evidence of the parties is stated with apparent approval. The seller's appraisal was stated at, using round numbers, \$360,000, but the commission, and also apparently the parties, eliminated therefrom an item of \$110,000 for franchises, organization, etc., and cash items, \$8000, leaving \$242,000 to be paid. By the terms of the agreement, the payment was to be made in the form of \$91,000 of the purchaser's common stock at \$65 per share, a one-year note at 5% for \$51,000, and outstanding bonds assumed, \$100,000, total \$242,000. The property back of this was shown to be:

Property devoted to electrical business,	\$62,425
Water reservoirs and distributing system,	87,300
Water rights,	100,000
<hr/>	
Total	\$249,725

[111] The decision points out that the Livermore company had been distributing at retail electricity purchased from the Pacific Gas & Electric Company, and that the latter, in the event the purchase were approved, would reduce retail rates; doubtless, we may assume, because of the economy afforded by cutting out the middleman. In response to a suggestion that it might later apply for permission to increase water rates, the commissioner suggested that it had a considerable reserve capacity and should endeavor to increase its consumption of water. The decision stated that the valuation would not be considered binding upon the commission in future rate-fixing proceedings. The defendant here cites this remark as justification for its contention that the Livermore sale should not be considered applicable here in a rate-fixing proceeding. I am unwilling to ascribe to the commissioner the view that a state agency, armed with the authority and bound by the duty

to fix a value in exchange at which a purchaser of public service property shall part with his money, may thereafter fix a value of the same property for rate-fixing purposes at a lower sum. This obviously would be confiscation. I understand the decision to refer to the unused reserve capacity of the water right, which, in a rate-fixing proceeding, might very well be in part deducted from total investment in determining the value of property in use. The commissioner also objected to the sale price of \$65 for the stock,—apparently the current market price, in view of previous authorizations by the commission at \$80; but concluded to approve the transaction nevertheless.

[112] Mr. Dillman, the city's engineer, who also appeared for both parties before the commission, stated that the purchaser's principal motive in the purchase was to obtain the electric business, because of possibilities of increased markets. That might well be. But the fact remains that it was buying an electric business valued by it at \$62,000, which would be so rated along with additions to capital as a basis for returns from the contemplated increased market, and paying along with that \$187,000, of which \$100,000 was for water rights, for a water business Mr. Dillman seems to think they did not want. Whatever the impelling motive, it is impossible to view these figures, and especially the predominance in amount, as between the three items, of the value ascribed to water rights, without attaching significance to the transaction as a fair sale in the market of a water business, including water rights.

There is a discrepancy between the figure of \$100,000 in the commission's decision and the figure of \$85,000 given by Mr. Bissell as the parties' agreement, which it is not possible to explain. I shall conclude that the transaction is evidence that in the vicinity the market value of water rights in 1912 was \$85,000 per M. G. D.

Mr. Lee rejects this sale as not comparable (9999, seq.). He says it is a comparatively small quantity of water, and compares it for sale purposes with residence supplies to rich people around Los Angeles and Santa Barbara where water is scarce. He also says, "I can readily see that a small quantity of water in that region, there might be a demand for it very much greater than [113] in the general bay region considered as a whole with respect to a large body of water" (10000). He repeats this observation (10001), and also suggests that the demand and the available market in San Francisco is such that that city has a larger

radius of possible sources of supply and can afford to go to the Sierras or the Sacramento river, which Livermore cannot do.

I am bound to observe that Mr. Lee's reasons for rejecting the Livermore sale are so inadequate as to compel the belief that he has neglected to give it due consideration because of the difficulty of squaring it with his conclusions drawn from cost. As to amount, a million gallons a day is not an insignificant figure. I have myself given no weight to sales of small amounts, such as the sale of one miner's inch, or about 13,440 gallons per day, at Montecito, at the rate of \$386,000 per M. G. D.; or the sale of springs of 1000 or 2000 gallons per day near Los Gatos for \$1400 and \$2000. A rich man developing a country estate does not stop to weigh accurately the price of the essential water supply; nor in other cases where the total money involved is small, will the difference of some hundreds of dollars be considered. But here the amount was a million gallons a day, the parties were business men, the purpose was for municipal supply, where rates must be earned under public regulation, and the sale approved by public authority. The incompleteness of the parallel is plain. Furthermore, the witness' conclusions that the Livermore price was high because of the pressing character of the demand there is not founded upon any facts. Livermore is a small farming town of 2000 inhabitants, and one million gallons of supply is at the rate of 500 gallons per capita per day. At the [114] rate of 100 gallons per capita, a liberal estimate, there is water there for a town of 10,000 people, a population not likely to be attained unless something unforeseen occurs; it certainly will never need consider going to the Sierras. Comparing the demand there with the demand in the cities around the bay, the figure of \$85,000 per M. G. D. for the latter would be very conservative.

This figure receives at least some corroboration from Mr. O'Shaughnessy, city engineer of San Francisco. Unfortunately, Mr. O'Shaughnessy was not asked to value these water rights as a whole. His testimony in that regard was incidental to his discussion of the question of the inclusion of the Pleasanton ranch lands, so-called, in the capital entitled to a return in rates. The inference as to water right values is not clear-cut or free from doubt, and opposing counsel draw different conclusions. The testimony will have to be read. (Tr., 10735-10749, 10775-80, 10800-01.) In this litigation, Mr. O'Shaughnessy and the city do not question the utility, and the propriety of inclusion in the rating base, of the

lands south of the Arroyo Valle on which the pumps are located, the Pleasanton well-tracts, so-called. My valuation (Appendix 3, lands in map 10) of these lands, already made, shows a figure of \$458,975. The lands to the north of the Arroyo Valle, the Pleasanton ranch lands, so-called, are objected to; and my valuation of tracts in this classification totals \$1,320,486. The testimony shows that all this land was included in the suit in condemnation filed by the city of San Francisco on December 31, 1913, and still pending. Later, in a proposition of purchase, agreed to by the officials of the parties for submission to the electors, the well-tracts were included, [115] also two strips at right angles through the ranch lands as sites for future wells, and rights to withdraw at least 15 M. G. D. (10744). The witness thought, however, that only 10 M. G. D. could thus be counted on for a continuous supply. These figures would on my valuation indicate a valuation of \$50,000 or \$60,000, or maybe more, per M. G. D. depending on the amount and value of the land included in the strips, which I have not data before me to compute. At page 10,749, he said he would take the ranch lands also if he were sure of 20 M. G. D. On my figures, this would mean an investment of \$1,779,461 (v. App. 3), or about \$88,000 per M. G. D. But on the one hand, this would not be a perfect right against lands to the east, and on the other, the cost could be reduced by sale of most of the ranch lands, reserving rights; so that we do not get any clear idea of the witness' value of water rights from this. At 10,778 seq. on redirect, he said that if he owned the well tracts, and the water rights under the ranch lands, he would give \$1,000,000 in settlements with farmers to the east for an additional 10 M. G. D. beyond the present supply; but he would not do so if he had to buy the ranch lands. Translated into figures upon my valuations of the entire Pleasanton lands, viz., \$1,779,461, this means that the witness would not pay \$2,779,461 for 20 M. G. D., or \$138,973 per M. G. D. On re-cross-examination (10,801) he said he would pay \$1,000,000 for an additional 10 M. G. D. Now, in a sense, this means a valuation of \$100,000 per M. G. D., as plaintiff's counsel contends, but the witness made it a special instance by the reference to its being "additional supply." He seems to doubt whether with all obstacles thus removed, a supply of 20 M. G. D. could be assured, but assuming this, it may be argued that the remaining or present right to [116] 10 M. G. D. should be worth an equal sum. But the well tracts were worth \$459,000, and this would require an

assumption that rights now owned to pump as against the ranch lands and several tracts to the east were worth \$541,000. If we add the million dollars damage settlements, and the value of the well tracts we get \$1,459,000; and dividing this by 20 M. G. D., assumed yield, we get \$73,000 per M. G. D. in round figures. But this allows nothing for rights that must be accounted for against the ranch lands and the other tracts to the east. Lee estimates this value, on the basis of damage indicated by actual pumping at \$122,000, which I think too low. This would raise the total cost to \$1,581,000, or \$79,000 per M. G. D.

Taking all these matters into consideration, including the Livermore sale, it seems to me that a value of \$85,000 per M. G. D. is reasonably indicated; and it seems to me that if he had been asked, Mr. O'Shaughnessy would have agreed that if, without buying any land except the pumping sites, whose cost would be small, he could obtain the right to pump from the Pleasanton gravels to 20 M. G. D., he would consider the right worth \$85,000 per M. G. D.

And since this is a pumped supply, involving increased expense of operation over the gravity supplies, it seems to me this figure may conservatively be taken as the measure of water-right values throughout the system.

It remains to consider Judge Farrington's valuation of \$63,600 per M. G. D. as of 1903. As stated before in the discussion of reservoir values, the lack of binding character of that opinion and, indeed, the question of its correctness is immaterial. It [117] was an impartial determination by one in authority touching a matter inherently indefinite and uncertain, the market value of these water-rights; and would be bound to have some effect upon the minds of persons interested. In other words, I give it consideration, just as Mr. Lee considered the effect of rulings of the Railroad Commission. Assuming it to be a correct figure for 1903, it follows that we must assume an appreciation in value, to check with a figure of \$85,000 in 1913. While the plaintiff's witnesses testified to a figure of \$100,000 for the entire period 1907-15, and Lee's figures, by reason of his cost method, allow nothing for increasing value, all witnesses agree that the market value of water-rights has been increasing. This must be so from the constantly increasing demand for water supplies in this vicinity, which is abundantly shown in the evidence. The city's counsel objects to my consideration of the Farrington decision; but it will be observed that its effect has been to lower my

estimate of value applied to the earlier years of this litigation. The rate of acceleration must be fixed rather arbitrarily, but I think it may be reasonably approximated at \$5000 in two-year periods.

As a result of all the foregoing considerations, I conclude and find that the fair and reasonable market value of the plaintiff's water-rights in the various fiscal years was as follows:

1907-08}	\$75,000 per M. G. D.
1908-09}	
1909-10}	\$80,000 " "
1910-11}	
1911-12}	\$85,000 " "
1912-13}	
1913-14}	\$90,000 " "
1914-15}	

[118] Our next problem is to determine the extent of these rights, or more exactly, the amount thereof to which the units of value just found shall be applied; and in connection with that, the question of whether the Pleasanton ranch lands, those north of the Arroyo Valle, shall be valued herein as property in use. I consider the latter question first.

The great fault which passes through the Calaveras and the San Ramon valleys shows its scarp between the Hearst property and the plaintiff's pumps; the lower country to the east formed by this great rift in the earth's crust has, in the course of the ages, filled up with gravel extending nearly to Livermore and fed by several streams. The westerly portion is overlaid by a clay cap, more or less continuous, in lenses. The gravel bed slopes from east to west. The contained water escapes by sweating through the clay cap, so that under natural conditions swampy ground was found in the western portion; or as artesian water, when the clay cap was perforated by wells. There is thus formed a natural underground reservoir or cup, whose gravels extend to a depth, according to geologists, of 2000 to 4000 feet (8979). The surface area is rich farming land.

In 1898, the plaintiff began digging wells at the southwesterly corner of the gravel-bed, the natural outlet; and between that time and 1902, acquired all the lands it now owns south of the Arroyo Valle (excepting parcels 276 and P268). These lands cost \$232,-816.40 (Defendant's Exhibit 227). The water thus developed was allowed to flow down Laguna creek to the filter-beds at Sunol,

where it mingled with the waters from Alameda creek, and was picked up by the Alameda pipe-line. In 1909, however, [119] the Pleasanton-Sunol pipe-line was constructed for this service, and a new pumping plant installed, and two more pumping stations in 1912 and 1913. In 1911, there were pending against the water company several suits brought by the owners of lands north of the Arroyo Valle to enjoin lowering of the underlying water-table by the company's pumping on the well-tracts to the south. The company considered a condemnation of rights to lower the water under their lands, and finally decided that it was the cheapest and most expeditious policy to buy the lands outright. In 1911 and 1912, accordingly, the rest of the present holdings at Pleasanton, referred to herein as the ranch lands, were purchased at a cost of \$1,535,-823.85 (Defendant's Exhibit 227). The winters of 1911-12, and 1912-13 were unusually dry. This is strikingly shown by the hydrograph (Defendant's Exhibit 187). In 1913 complaints were made by farmers to the east that the company's diversions were lowering their wells; and this drop of the waterplane was especially marked just west of Livermore, in the shallows, as it were, of the underground reservoir. I may here remark that while it is possible that this lowering was in part due to the pumping, I agree with Mr. Eastman (10980) that it is quite likely to have been due in greater measure to the lack of rain through two dry seasons. At the time of the trial of these cases, an arrangement had been almost concluded that would give the company the right to pump at will by assuming a burden to deliver compensating amounts of water for irrigation needs (9865). When that agreement is concluded, I infer that plaintiff may pump from the gravels to the limit of their possibilities; at present, its rights are limited.

[120] The purpose and utility of the so-called ranch lands, then, is not to protect the supply from pollution, for the clay cap does that; but to make it legally possible, by virtue of ownership, to lower the water table by pumping on the adjoining lands to the south. The purpose and utility of the well-tracts is the same; and also to furnish sites for development by wells and diversion by pumps and other structures. Both sides agree that the well-tracts are used and useful; the city challenges the inclusion of the ranch lands.

As to this, the company claims the valuation of the right it possesses to withdraw water from these gravels as a water-right, and also of the ranch lands, as an underground reservoir, performing all

the functions of storage and regulation of supply which a constructed surface reservoir would supply. The city contends (I am not sure which), either that the purchase or the retention of the ranch lands was improvident and extravagant; but that \$122,000 should be allowed in the valuation of water-rights to cover the right to lower the water-table under them.

I agree with neither party. I disagree with the plaintiff, in respect to allowing a reservoir function for the ranch lands as well as a water-right value. The reservoir is there irrespective of plaintiff's ownership, and if it possessed the complete right against all the overlying lands to divert all the water, it would not need to own an acre beyond its well-tracts. In a surface reservoir land must be bought so that it may be flooded; here, that condition exists, without impairing the utility of the surface for other purposes. The water is, [121] in a sense, a crop from the land, and if we value both land and the right to take the underlying water, we are duplicating values. There is thus presented the alternative of valuing the ranch lands in the rating base, deducting the water in our estimate of the extent of the total water-rights; or, on the other hand, of accounting the value of the right to divert the water, and omitting the value of the land.

If I accepted the latter alternative, as the city believes should be done, I should not follow Mr. Lee's figures, but the values of water-rights heretofore found. If the company had condemned the rights to lower the water under the ranch lands, I cannot believe it would have secured those rights for \$102,000, as Lee estimates. This figure is a total, obtained by finding the increased cost of pumping on the various tracts purchased, as between the former pumping level and the lower level caused by the company's operations, as observed by records of wells over a term of years. Now, if I understand the situation, this is hindsight and not foresight; in other words, the company could not have produced the evidence Lee now presents, at the hearings in condemnation; it was obtained from the subsequent operations. Furthermore, Lee has estimated only on the observed lowering, which has been restricted. But what the company would want on a condemnation and what it now has by its ownership, is the right to lower the water *ad imos* as against these lands; and Lee's figures do not cover this.

The objection to allowing the value of the ranch lands is obviously their cost relative to the present water production. But they were bought when a scarcity was imminent; and we may

[122] note that the purchase was most timely, for it so happened that not only one, but two extraordinarily dry winters ensued. I think the purchase of the ranch lands was a prudent and necessary measure, and nothing in the city's evidence seems to me to show reason for a contrary conclusion. Mr. O'Shaughnessy (10745), says that he would have gone on with the Calaveras development; that the dam could have been built high enough to have stored some water in eighteen months. I suspect that this again is hindsight and not foresight. In November, 1913, in an official report (10747), he recommended the purchase of the ranch lands by the city as a part of its water system; later, when he had reason, from the company's records, to believe the possible yield was less than he had first believed, he changed his view. He concedes the company's good faith, but doubts whether they had secured sufficient information before purchase. All such criticism after the fact strikes me as harsh and unjust.

But conceding the propriety of the purchase, should the ranch lands have been retained? The city urges they should immediately have been re-sold ex water rights. Some time would have to be allowed for an advantageous sale, and I doubt if the question would be material except for the last two fiscal years here in controversy. Mr. Eastman (10965-7, 10982-3) shows very clearly that the ownership of these lands placed the company in a stronger position, not only in their dealings with the objecting farmers referred to, but in their plans for the complete development of the Pleasanton gravel supplies in relation to the Arroyo Valle. I refer to the testimony for a fuller [123] statement. Mr. Eastman announces the company's intention to sell these lands, ex water rights, as soon as these objects are accomplished. I conclude that these lands were prudently held during the period of these suits and are to be accounted in the property entitled to a return. It will not do for the company to hold them indefinitely at the cost of the ratepayers; how long this period should be is not for this court to determine here.

The next matter to be determined is the amount of water to be subtracted from the total Alameda supply to represent the Pleasanton supply here deemed included in the valuation of the lands. And in that connection we must consider how the extent of the water right shall be measured; that is, the figure we shall use to multiply the unit figure of value per M. G. D. in order to obtain the total value of rights to divert. Shall we follow plaintiff's plan

and determine the extent of the rights by the maximum diversion sustained for one month? This may measure the *right*, and would be of interest in a contest with others claiming rights on the stream. Or shall we measure it by the average *possible* diversion during the fiscal year? Or shall we measure it by the average *actual* diversion during the fiscal year? It should be stated that no claim is made for the inclusion of rights to divert, either already accrued or in process of acquisition, which are not yet developed and in a position to use.

The answer to the questions propounded requires reference to the peculiarities of the Alameda supply. Elsewhere the continuity of the supply is secured by surface reservoirs. There are no reservoirs in the Alameda system of this period; the gravels [124] at Sunol and Pleasanton perform that service, to a limited extent only. In this connection the hydrograph of Alameda creek (Defendant's Exhibit 187) is most interesting. It shows the enormous amount of water that in winter wastes over the Sunol dam. The hydrograph is depicted to show a maximum amount of 200 M. G. D. only, a flow frequently long sustained; but the marginal figures show peak flows for a day or more in the winter in the thousands of millions of gallons daily, and as high as 10,821 M. G. D. From the hydrograph we appreciate the great possibilities of the Alameda supply and the amount thereof, now wasted, which will be saved by the Calaveras dam. Hazen states that the average flow of Alameda creek at the Sunol dam is nearly 150 M. G. D. (8543). The limit of the Alameda diversion is the capacity of the Alameda pipe line, 17 M. G. D. (Sharon, 87) or 16 M. G. D. (Herrmann, 10999), until about the end of 1913 (10998-9), when it was increased by the Ravenswood booster to 21 M. G. D. (Herrmann, 10999, Sharon 95).

It is important to observe (and the hydrograph shows it clearly), that this diversion is accomplished by alternate drafts from the Sunol gravels and the Pleasanton gravels. During the flood periods and as long thereafter as the Sunol gravels are saturated, the supply is taken from there, with obvious economy. But this is not possible throughout the year, or generally after midsummer. The pumps at Pleasanton are then started to remedy the deficiency at Sunol and operate until the winter run-off begins. This furnishes the answer to the company's claim that the water right on Alameda creek should be measured by the maximum [125] monthly diversion. It might be argued that that is measure

of the right as against an irrigator down the stream, but the flow for one month cannot be compared, in *value* for domestic uses, to a flow of the same amount throughout the year. We are trying here to subtract the Pleasanton addition, and therefore we may treat the problem as if the Pleasanton supply did not exist. On that assumption, it seems to me obvious that we should measure the right, for purposes of valuation in domestic supply, by the average diversion through the year, since it is of equal value at all times, and not by the maximum figure, which may be the measure of the legal right. Should this yearly average be of the actual diversion or of the possible diversion?

I have accepted the figure of \$85,000 per M. G. D., shown in the Livermore sale, as my principal index of the value of these water rights. That represented a value for a diversion that was *possible*, both legally and with the structures in existence; the *actual* diversion for a town of 2000 must have been much less than 1,000,000 gallons daily. The logic of the analogy furnished by the Livermore sale seems to require that in adopting that unit of value per M. G. D., I should likewise adopt, as to the extent of the water right, the yearly average of the possible diversion, otherwise expressed as the safe average yield. There are reasons, however, why I have adopted the *actual draft* from the various sources as a measure of the right. If we figure by the former method, the yearly average of possible diversions, we must first deduct the yield of the Pleasanton source. This may be estimated at 7 M. G. D. from 1913 to 1915 (Herrmann, Exhibit 219), and 5 M. G. D. before that time (Eastman, p. 10979). If we measure [126] the total by the pipe capacity, the Alameda diversion (deducting 5% for pump slippage at Belmont) thus becomes, for the last two years 14 M. G. D. and for the earlier years, 11 M. G. D. There is sufficient agreement among the witnesses to warrant us in taking the safe average yield of the peninsular rights at 19 M. G. D., and of Merced 3.4 M. G. D. The resulting computation of the values of the water rights, excluding Pleasanton, is as follows:

1907-08}	33.4 M. G. D. at \$75,000 = \$2,505,000
1908-09}	
1909-10}	33.4 M. G. D. at \$80,000 = \$2,672,000
1910-11}	
1911-12}	33.4 M. G. D. at \$85,000 = \$2,839,000
1912-13}	
1913-14}	36.4 M. G. D. at \$90,000 = \$3,276,000
1914-15}	

But the above calculation follows Herrmann and Anderson in measuring the Alameda diversion by the pipe-line capacity of 21 M. G. D. and 16 M. G. D. This is only justified by the assumption that the maximum month's diversion is the measure of the right, and this I have disapproved. The only record where Sunol and Pleasanton waters are estimated separately is Exhibit 219, where Herrmann showed actual drafts for the last 3½ years of the period. Exhibit 12w shows actual drafts in M. G. D. from the different sources. Both these exhibits are by calendar years; I have recomputed them for fiscal years and have annexed the amended exhibits as appendices 4a and 4b respectively. These tables show that the assumed averages from the Alameda source of 21 M. G. D. and 16 M. G. D. are not warranted. To correct this, I have made a [127] table, assuming the peninsular and Merced diversion at 22.4 M. G. D., the safe yield; for the last three fiscal years, taking actual draft from Sunol as shown by appendix 4a; and for previous years, actual draft from the Alameda system as shown by appendix 4b, less an allowance of 5 M. G. D., estimated Pleasanton draft. I give it mention for the interest of the parties, but do not include the calculation, since the results were not harmonious or apparently logical. For example, the water right values shown for 1907-08 were greater than those for 1912-13.

To correct this, let us take actual draft at Sunol from appendix 4a, at the following approximate figures: 1914-15, 20 M. G. D.; 1913-14, 16 M. G. D.; 1912-13 and all previous years, 13.5 M. G. D. From these totals I deduct estimates for Pleasanton, 7 M. G. D. for the last two years and 5 M. G. D. for prior years. These are approximations, but that seems inevitable by this method. I take the Merced and peninsular yields at 22.4 M. G. D. as before. The result is as follows:

1907-8	}	30.9 M. G. D. at \$75,000	\$2,317,500
1908-9			
1909-10	}	30.9 M. G. D. at \$80,000	\$2,472,000
1910-11			
1911-12	}	30.9 M. G. D. at \$85,000	\$2,626,500
1912-13			
1913-14	}	31.4 M. G. D. at \$90,000	\$2,826,000
1914-15			
		35.4 M. G. D. at \$90,000	\$3,186,000

This seems the most reasonable computation, on the basis of the measurement of water rights by possible diversions, that occurs to me. It contains rather more of estimated figures than would be

most desirable, but might well be accepted as a just basis for findings.

[128] I have finally, however, prepared a computation based on *actual draft* from the various sources. The total draft for 1914-15 has been estimated; the draft from Pleasanton for the last three years has been approximated from appendix 4 a, and for the remaining earlier years has been estimated. Otherwise, the facts are derived from appendix 4 b. It follows:

Year	Total draft Pleasanton		M. G. D.	
1907-8	31.5 less 5.	=	26.5 at \$75,000	= \$1,987,500
1908-9	32.6 less 5.	=	27.6 at \$75,000	= \$2,070,000
1909-10.....	34.9 less 5.	=	29.9 at \$80,000	= \$2,392,000
1910-11.....	36.1 less 5.	=	31.1 at \$80,000	= \$2,488,000
1911-12.....	37.8 less 5.	=	32.8 at \$85,000	= \$2,788,000
1912-13.....	40.2 less 7.	=	33.2 at \$85,000	= \$2,822,000
1913-14.....	39.25 less 5.25	=	34. at \$90,000	= \$3,060,000
1914-15.....	41. less 7.	=	34. at \$90,000	= \$3,060,000

The objections to this computation are, that it does not conform to the analogy of the Livermore sale; that it makes no allowance for water-rights or capacities in reserve; that for the first two years the totals are below Judge Farrington's figures for 1903. On the other hand, being rated on actual draft, it gives value on the basis of actual use; and, besides, the table is to a greater extent founded on actual figures rather than estimates. As compared with the previous table, the values for four of the years are lower and for four years are higher; the average is somewhat lower.

The whole matter of valuation of water-rights is at best one of reasonable estimate, and precision cannot be hoped for. While I could perhaps with better logic justify the previous table, I have concluded to adopt the results shown in the last table as my findings of value; and I find accordingly.

[129]

VALUE OF STRUCTURES ON DECEMBER 31, 1913, EXCLUDING OVERHEAD COSTS, INTEREST DURING CONSTRUCTION AND DEPRECIATION

The structures of the plaintiff were by all the witnesses valued as of December 31, 1913, a date deemed representative of the fiscal year 1913-14; and adjustments due to additions during the period 1907-15, and to the operation of depreciation were made after-

ward. Value was by all witnesses determined by cost, actual costs in the few instances of new construction, but generally the estimated costs of reproduction. In all such appraisals of value by reference to cost, there must be recognized certain usual and inevitable items of expense, which are, at least in the method of appraisal by estimated reproduction, best taken care of by the addition of a percentage or percentages to the total of construction costs; these comprise preliminary expenses, overhead expenses during construction and interest during construction, frequently referred to collectively as overhead. Following the witnesses in this case, I shall consider these percentage additions later under a separate title. The value new being thus determined by reference to cost new, we have then to take account of the fact that the plant is not new, and to determine the present value by determining and subtracting the amount of accrued depreciation. This will likewise follow in a separate discussion.

The magnitude of the task presented to the witnesses and to counsel in this appraisal may be appreciated when it is seen that the agreed inventory, Exhibit 11, devotes 342 closely printed [130] pages to an enumeration of structures (with agreed quantities and ages), complete to the smallest unit. Each of the appraisers have filed appraisals following the inventory. The labor of the master has, however, been greatly reduced by the witnesses, who have regrouped the appraisals in schedules arranged in comparative form by major groups, and further by reaching agreements as to the valuation of many important items. The attitude and excellent work of the engineers and counsel in this regard deserves high commendation. Finally, the clear and succinct way in which the facts have been presented in the argument by Messrs. Greene, for the company, and Searls, for the city, and the ability displayed in furnishing me with contrasting points of view as to the proper deductions to be made as to the truth of these facts, have been wholly exceptional, and worthy of the highest ideals of the advocate's duty. With all this assistance the task of the master has not been a light one. While my conclusions have been partly formed as the evidence went in, I have re-examined the evidence carefully in the light of, and as referred to in the argument. In this branch of the case, the master's findings will, under the decisions, be for all intents and purposes, practically conclusive (*U. S. v. Cooksey*, in this court, per Van Fleet, J., decided January 18, 1917); and while this fact has added

to my sense of responsibility, it has suggested the undesirability of presenting to the court a full discussion of my views upon the many questions involved, or anything beyond brief reference for the enlightenment of counsel.

I have referred in the opening to modifications introduced in this hearing in the mode of presenting the evidence, and have [131] characterized the trial, so far as it concerned engineering questions, as an approximation to an arbitration between engineers. It was not that, of course, and could not be because the master is not an engineer. The primary evidence was the opinion evidence as to value of the expert witnesses; but I required also that the witness should justify his judgment by stating his reasons therefor, partly to assure myself that the opinion represented a reasoned judgment, and partly to confirm by my own reasoning the validity of the conclusion reached. It was in this way that there arose an apparent violation (though, in my judgment, not a real one), of the hearsay rule, in that final costs on similar pieces of construction elsewhere were freely admitted without verification by a competent witness to their truth. Engineers commonly use the costs of work on other construction, either done by them, or by others if and to the extent the latter seem to them reasonably authenticated and complete, as checks and aids to their own judgment; and so they have been used here, no question being involved or determined as to the truth of the cost-figures of others so admitted. Thus where an engineer, whose credibility as an appraiser of the value of riveted pipe has been first shown, has offered an opinion as to such value, supported by reasons and by data as to pipe-costs of another engineer in Portland, I determine the fact by the credibility of his opinion, viewing the hearsay not as truth but as an evidence that he has used all the information that to him seemed likely to be true. But when an engineer who is legally competent to give an opinion, has had no experience touching riveted pipe, his opinion as to its value lacks the credit which such experience would give; and the support of hearsay figures will not save it from the [132] rejection its inherent weakness demands.

It is thus seen that the master is in the end dependent in his search for the truth of the facts upon the expert witnesses. And while I have endeavored in this search to test the evidence by examining the validity of the reasoning which supports it, I have also tested the personalities of the witnesses, their knowl-

edge, their industry and carefulness, their mental integrity and freedom from bias. The opinion witness, or expert, is, like the judge, a minister of justice, having peculiar responsibilities beyond ordinary witnesses to facts. It is not compatible with his high function that he should be the advocate or partisan of the party who calls him. And expert witnesses should take warning that testimony will fail to gain the credit which the witness's knowledge may justify, if the court has reason to suspect that the witness is not whole-heartedly endeavoring to determine the exact facts. This observation as to the proper attitude of the expert witness is intended to be of general reference, derived from my experience, and calculated to guide future proceedings; though there are not lacking instances in this litigation where it is pertinent.

Allen Hazen, of New York, the leading engineer witness for the complainant, fulfills in the highest degree the requisites of an expert adviser of the court. He is, as the city generously admits (1402), one of the leading engineers in this country in waterworks and sanitary practice. He has had extensive experience, both as a consultant and in the designing and actual supervision of construction of waterworks. His practice has extended all over [133] this country, chiefly, of course, east of the Rocky Mountains; he has been called to Ottawa, Canada, and Brisbane, Australia. He has been employed by the government of the United States in connection with the water supply of Washington and of West Point, and in 1909, was one of a board of engineers reporting to President Roosevelt upon the Gatun dam and the general condition of the work on the Panama canal. He has been repeatedly consulted by the City of New York and is now acting in a consulting capacity in connection with that city's development of a greater water supply. In 1911, he was employed by the city of San Francisco in connection with its Hetch-Hetchy plans and reported upon the cost of a supply drawn from the Sacramento river. He has had wide experience in valuations of water-plants, both for sale and for fixing of rates. In all these employments, he has appeared at times for the cities and at times for private companies. He is the author of several standard works on hydraulic engineering (4164-4177).

His testimony shows that he spared no effort to learn the facts relating to the Spring Valley structures and costs past and present, whether by examination in the field, office records or

personal inquiry. His mind works upon the material thus assembled with the simplicity and precision of a machine. He had first-hand and complete knowledge, covered by experience, of every class of construction represented in his appraisal, excepting the wooden flumes. His explanations were readily comprehended by the lay mind,—a rather notable achievement considering the technical character of the subject-matter. While he is evidently a master of the theory of his subject, his bent [134] is toward exact facts and practical solutions. That a man of Hazen's position and mental attitude and equipment must necessarily be quite unbiased and fair to both sides, would go without saying; but it is pleasant to record the fact.

If Hazen had offered evidence for the city, and the city's witnesses had appeared for the plaintiff, the superior authority with which he speaks would, in consideration of the burden of clear proof resting upon the plaintiff, be conclusive upon the matter, without long re-examination of his testimony. But as the matter stands, in view of that burden, I have reviewed the evidence in detail, and while I have not expected or required a demonstration of the validity of the reasoning underlying Hazen's opinions, I have reduced his estimates where I have felt a doubt. It will, of course, be conceded that Hazen's lack of experience in Western construction is an element of weakness. This must not be pushed too far; an engineer of Hazen's breadth of experience necessarily learns to make adjustments for differing conditions, and his fitness to estimate on work in California is testified to by the city's employment of him in 1911. His evidence shows how he makes adjustments for difference in labor and material costs by study of records and inquiry of others; but there will be elements in the inquiry, for example, the efficiency of labor, where his opinion may not be so authoritative as elsewhere. It will be seen, however, that I have followed Hazen more nearly than any other witness.

Leonard Metcalf, of Boston, is the other leading engineer witness for plaintiff. He has had extensive experience in water-works design and construction, and apparently rather more than [135] Hazen's experience in their operation. He has had to do with many appraisals for all purposes, and, as a member of the special committee on valuations for rate-fixing of the American Society of Civil Engineers, is fully conversant with the many difficult and unsettled problems that such appraisals present, and of the various points of view regarding them. He did not

give evidence in detail as to the structures, though by virtue of his own investigations and his co-operation with Hazen in his studies, he was enabled to corroborate the latter's figures in general terms. He gave his attention to such matters as depreciation, going value, actual investment, and the final summing-up of plaintiff's case, matters in which he displayed enormous industry and care, and a fair judicial spirit. Mr. Metcalf had charge of the preparation of plaintiff's case in its technical and general aspects, so far as completeness and orderliness of presentation were concerned. It might be expected that in such an employment he might imbibe some of the partisan character of the advocate, but happily his evidence and that of Mr. Ellis, who performed like service for the city, was quite devoid of any appearance of bias.

Messrs. Lippincott, Herrmann and Elliott gave estimates as to certain engineering structures; all are well-equipped by experience. Mention should not be omitted of the assistance rendered by John J. Sharon, assistant engineer of the water company, whose ready memory and encyclopaedic knowledge of the company's properties and affairs, and of the record in this case, has been impartially used by counsel and witnesses for both parties and by the master.

[136] If my appreciation of the company's witnesses may perchance seem unusually detailed and emphatic, it is because it seems advisable to give weight to the thought that in a litigation like this, of the first order in point of difficulty and importance, it is necessary that the court should have the advice of expert witnesses of the highest type in ability and in character. Unfortunately, the city has not been so well served in this respect.

N. Randall Ellis, of San Francisco, chief valuation engineer in the city attorney's office, in addition to his oversight of the preparation of the city's case, gave estimates of reproduction costs in certain matters to which his experience extended. He declined to estimate as to costs which did not come within the specific field of his actual experience in construction—an attitude which is to be commended. I have accordingly given weight to all that he has said.

J. H. Dockweiler, of San Francisco, presented a full appraisal of structures. His work has been performed with painstaking care and has been assisted by a knowledge of the history of the Spring Valley construction, derived from his experience as a witness for the city in the 1903 case between these parties. He has appeared

also for the city of Oakland in valuation cases before this court and the Railroad Commission, and in other valuation cases. In view of this, it is surprising to note that he has had so little experience in engineering construction. His early experience was in surveying parties, and at the age of 25, in 1889, he became City Surveyor of Los Angeles. In 1891-94 he was City Engineer of that city, and held the same office during 1897-8. In the interval he was in private practice, engaged in [137] estimating for contractors bidding for work in Southern California. Between 1899 and 1904 he was engaged in mining, partly as an investigator and partly as owner. Since 1904 he has been almost exclusively engaged in valuation work for various municipalities. As City Engineer, he made plans and specifications for many miles of sewers and paving, and for bridges and the like municipal work; but much of this work was done by contractors under the supervision of the superintendent of streets. (4212-13.) An outfall sewer, comprising wood-stave pipe siphons, brick conduits, several tunnels, and a cast-iron outlet among its elements, in all $12\frac{1}{2}$ miles long, was designed by him during his first term, and built by contractors under his supervision. In this work he outlined the general plan and employed an advising engineer to do the detail work. (4208-9.) He also laid 400 feet of cast-iron sewer pipe across the bed of the Los Angeles river. He made plans, located the line and specified the depth for a 12-inch slip-joint water pipe of sheet-metal about a mile long, which was built by a local pipe works subject to his approval. This experience in public office was valuable so far as it went, but is meager in amount compared with that of the other witnesses, rather remote in time, and touches the subject-matter of the appraisal at only a few points. The witness has endeavored to remedy this deficiency of first-hand information by diligent reading of the literature of appraisals and by exhaustive compilation of costs of work done by others. He has employed assistants of more direct experience to make estimates for portions of his appraisal, and some of these were properly offered for cross-examination. He has made frequent use of quotations by [138] manufacturers, a practice which both Hazen and the city's witness Dorward have condemned as misleading and likely to represent inferior work. His figures for the important item of riveted wrought-iron pipe, for example, are based in part upon quotations by a Los Angeles pipe factory, as a friendly service, to whom he communicated his purpose in asking the figures, but to whom he did not convey the very exacting speci-

fications upon which the pipes were actually built. It is not to be expected that a careful or exact estimate would be forthcoming upon a matter of no business promise. So far as the estimate is based upon statistics of other work, it would be valuable if the comparability of that work were verified by a witness trained in actual experience of construction; but this experience, as stated, is lacking to an unfortunate degree.

George L. Dillman, of San Francisco, also presented a complete appraisal of structures. He has had considerable experience in railroad construction, and for three years was chief engineer of the Western Pacific Railroad, during construction. He has had to do with the construction attendant upon a number of irrigation projects, both as engineer and as contractor. He has built portions of plants for domestic water-supply, including some pumping stations and about twelve miles of 18 or 20-inch pipe for the Oakland Water Company in 1898. He built a complete water system, drawing on wells, for the town of Oakdale, a farming town in the San Joaquin Valley. He has done some massive concrete flume work on the Willamette river in Oregon. His foundation of practical experience is thus fairly extensive, though in water-works construction not comparable to Hazen's, even with his advantage of practice under local conditions. He is the antithesis [139] of Dockweiler in his treatment of costs of other work; he does not keep or use either his own or others' costs upon construction, except in so far as they may react upon his judgment. His appraisal does not display the industry and care in learning the facts and making exact analyses of problems characteristic of Hazen's; indeed, it seemed rather casual and offhand. I doubt if he would so estimate for work that was actually to be done. He did not, for example, read the specifications under which the work was actually done. Perhaps in consequence of this attitude toward the problem before him and of this method of handling it, he was frequently not able satisfactorily to justify his estimates by any reproduction of his reasoning, otherwise than by blunt assertion of the fact. I am convinced that the figure submitted by him would not reproduce the plaintiff's plant as it stands, or one approaching it in excellence. I have noted that where Ellis submits figures, they are higher than either Dillman's or Dockweiler's.

David Dorward, who testified in respect to riveted pipe and submarine pipe, was a fully qualified witness. I may refer to others in connection with the subjects upon which they testified.

The appraisals of structures, as new, omitting overhead, interest and stock on hand, are:

Hazen	\$19,501,694
Dockweiler	\$15,449,545
Dillman	\$15,892,512

Engineers differ as regards the underlying hypotheses upon which the reproduction method of valuation is to be founded. I quote the following, abstracted by me from Hazen's testimony [140] (4287 *seq.*), and note that its assumptions are liberal to the city. He says:

“The first business was estimating the cost of the works in the whole system. I went at that with the aid of the plans and the schedule, and made an estimate of what, in my judgment, was the fair cost of the reproduction of the whole system as of the first of January, 1914, and taking into account the prices that were current and that had been current for supplies and labor for a few years prior to that time. In the more recent consideration of the subject, I have considered particularly the prices that ranged in the period 1907-14. In the case of some construction work done within the last few years, I checked it over and found it reasonable, and wrote in those figures. The older records of cost that I was able to secure I considered from time to time and gave them such weight as they seemed to deserve, but in general the farther back a cost record is in point of time, or in point of changes in conditions, prices and labor, the less consideration I gave it in making up the estimated cost of reproduction. I drew on all the experience I have had in making the estimated cost of reproduction, and the sources of information and experience differed very much for the different items. I used whatever seemed to be most appropriate and best and reliable for each kind of structure as it came up. I define fair reproduction cost as an amount for which the plant, under good average management, can be built at prices that yield fair compensation, fair profits, to every one who contributes to the construction of the plant. The prices of labor and materials fluctuate from time to time. In the 20-year period there has been more than a 2 to 1 ratio between the minimum cost and the maximum cost of iron products, covering cast-iron and steel. The cost of labor has also changed. In a general way, in the decade of the 90's, labor costs were very low. Times were hard,

labor was abundant, and work was done very cheaply. In the last year or two of that decade, matters improved, and beginning with 1900 and the years that followed, there was quite a boom, and labor was much more scarce and the price of labor went up very rapidly. Since that time there has been a continued, though much slower, increase in the price of labor. The other materials have fluctuated, sometimes going up and sometimes going down.

“In making my valuation I take into account the improvement in the art of doing a given piece of work over that of the time of actual construction and assume that the work will be done in whatever manner is most [141] advantageous at this time. The cost of reproduction less depreciation is not controlling as to value, though perhaps the most important single element. My method of appraisal is to go at it exactly as I would do if the property did not exist and the problem was to find out what it would cost to build it. In doing that I take into account all the experience I have had, especially the cost of building similar works—as nearly similar as may be, because there never are any works that are exactly similar to those estimated on; also the difference in labor conditions; the conditions of cost of materials as affected by freight and otherwise; conditions of climate which make a difference oftentimes in cost of construction, and all the conditions that there are that influence the cost of construction and increase it or decrease it above what it has been in works for which I have information and which I use as a basis for forming a judgment as to what it will cost to produce these works.

“In my opinion quotations of prices for material play very little part in appraisals, though sometimes helpful; in my experience they are not reliable, and are apt to be quotations for material different from those actually used or those which would be bought upon reproduction of the plant. Contract prices for similar work play some part and often are quite important. They have to be taken, though with a good deal of allowance, with knowledge of the conditions, and as to whether the contract prices were adequate or not. Contractors often take work at prices for which they cannot complete it. Sometimes they will carry it through at a loss and say nothing; sometimes they go into bankruptcy and it is completed at increased cost. In nearly all cases, there is extra work not governed by the contract, and it is very common for the final esti-

mate that the engineer makes to the contractor for settlement of his work in the end to differ quite a good deal from the price at which the contract was let. So that while contract prices are helpful, if used with discrimination, they are not as safe a basis as the records of the cost of finished work.

“The experience of appraisers whether with small works or large, is important to note. The problems are different. Some people are very competent to build small works and it does not necessarily follow that they will be successful in building large ones; and the converse is true.”

I consider first the cost of reproduction of the riveted wrought-iron pipe outside San Francisco.

[142] (1) Riveted Wrought-Iron Pipe (Outside of City)

The total estimates are (excluding pipe at pump-stations):

Hazen	\$3,413,059
Dockweiler	\$2,511,095
Dillman	\$2,544,179
Ellis-Dorward	\$2,901,692

I take these figures, not from the witnesses' exhibits, but from Table 1 in plaintiff's argument (Arg. 581); in plaintiff's Table 2 (Arg. 584) and defendant's Table 1 (Arg. 1423), Dockweiler's figure is given at \$2,514,000, and Dillman's at \$2,551,279.

There are about 100 miles of riveted pipe in the system, both within and out of San Francisco, from 12-inch to 54-inch in diameter, an average diameter of 35½ inches, and an average thickness of .188 or practically 3/16ths of an inch, the total tonnage being 20,731, of which 431 tons is steel. (Exhibits 98, 98a.) The steel averages six years old (4311), all the earlier pipe being wrought-iron. There are 120 tons of steel pipe and 422 tons of iron that have less than standard riveting, and 670 tons of slip-joint pipe, all on lines of little or no pressure (Exhibit 98d, 4312); the balance of the lines are thoroughly riveted and caulked. (4312.) Down to 1902-3, when the Alameda 54-inch line was built of the higher grade of wrought-iron called charcoal iron, the iron used in the pipes was of the kind called puddled iron, and was, as Hazen characterizes it, “of magnificent quality”. (4314.) He says:

“This old Scotch iron, much of it one-tenth of an inch thick or thereabouts and averaging 45 years old, has stood

wonderfully, and the recent pipes—all of the pipes were [143] in splendid condition. I have never seen old pipes in any water-works system, right through in as good order, as free from rust and corrosion as the riveted pipes of the Spring Valley system" (4314).

While there are no steel pipes 45 years old, experience shows that their life is much shorter than iron pipes, and they are much less desirable. (4317.)

In the event of actual rather than hypothetical reproduction, the conditions of the market are such that steel would be used, at least for the larger diameters. Hazen accordingly submitted an alternative estimate for steel pipe, using, however, such larger diameters as in his judgment would allow for the more rapid corrosion and tuberculation of steel as compared with iron, so as to reproduce actual carrying capacities at the actual age of the pipes. He finds that to replace the pipe with steel in this way would cost more in the aggregate by a substantial amount. (4370.) Dillman figured the iron lines on the basis of steel of the same diameters; the result would be that, age being considered, he would have not only inferior material but less carrying capacity in his reproduced system.

Hazen submits two estimates. The one used in his detailed and final appraisal proceeded by office formulas from weight to a price per foot for each diameter of pipe, including excavation. The other, a check estimate exceeding the first by \$27,000 in a total of nearly \$4,000,000 for all the pipe in the system, applies prices per pound for cost of metal and fabrication, etc., and for excavation per cubic yard, with additions for auxiliaries, and thus lends itself more readily to my determination. I see no reason for pursuing the laborious computations necessary to determine [144] prices per foot of the different items. Hazen's check estimate will be found in Exhibit 98j, pages 15, 17, 18.

Hazen's weights are conceded by the city (Ellis, 10855, Arg. 1448); also the cost of metal f. o. b. San Francisco, at 4c per pound. (Dockweiler, 4325; Ellis, 10855.) For the "cost of manufacturing, coating, transporting finished pipes from shop to trench and connecting up and caulking in trench, including bends and manholes but not gates, air-valves, blowoffs, anchorages, connections, excavations, etc.", Hazen derives a figure of 3.75 cents per pound. (Exhibit 98j, p. 15.) I shall not reproduce or explain his computation. I shall omit an item in it, of .06 cents, increase of

cost since October, 1912; Mr. Hazen himself does not seem to think the evidence is sufficient to support it. (4513.) Hazen estimates that the cost in San Francisco shops would be 20% greater than in Eastern shops; Dorward, 10% to 12%. I use 15%. With these changes the figure becomes 3.52 cents per pound. In this connection it may be noted that Hazen figures the probable *actual* cost at 3.82 cents.

As a figure for excavation and backfill covering the entire system of pipe, Hazen uses 75 cents per cubic yard, and makes additional allowance for obstacles and difficulties where the pipe is in country highways and city streets. The Spring Valley costs, as refigured to later conditions of wages and hours by Lawrence, would support a much higher unit. Dockweiler's figure is 71 cents; Dillman's 50 cents. There is no mention made by the engineers last mentioned of difficulties in highways, and I am inclined to think it was not considered by them. Ellis figures 65 cents for straight work; his figure including obstructions in [145] highways would be about 71 cents. I adopt 70 cents, and allow Hazen's figures for the difficulties in highways, etc. Adapted to cover riveted pipes outside the city, not elsewhere accounted, the computation is as follows:

Cost of metal, 33,311,400 lbs. @ 4c lb.	\$1,332,456
Fabrication, etc., @ 3.52c lb.	\$1,172,561
Less for under-riveted and under-caulked pipe, Pleasanton line, 542 tons @ 1c lb....	10,840
	<hr/>
	1,161,721
Excavation 450,155 cu. yds. @ 70c	315,108
	<hr/>
	\$2,809,285
Add for gates, air valves, blowoffs, bands and lead joints, connections, concrete in trench, contractor's extras, and all ordinary accessories and contingen- cies, 10% of above.....	280,928
	<hr/>
	\$3,090,213
Add miscellaneous items, separately listed in schedule including allowance for extra work in highways....	214,777
	<hr/>
	\$3,304,990

This figure will be adopted for this item of riveted pipe outside the city, except as hereafter specified in other structures.

Earth Dams—Flumes—Crystal Springs Upper Dam

These subjects were separately considered by the witnesses. An agreement was reached as to flume lumber in place, leaving only the question of excavation cost in the flume valuation. Counsel have accordingly discussed together the earth-work figures in the three subdivisions of structures indicated in the sub-title, and I follow them.

[146] Hazen, Herrmann, Martin and Lawrence submitted estimates for plaintiff; Dillman, Dockweiler and Ellis for defendants. The estimates of those figuring on all the work are:

	Hazen	Dockweiler	Dillman
Earth dams	\$948,841	\$545,926	\$599,316
Crystal Springs—			
Upper dam	261,300	184,283	171,143
Flumes	303,745	235,520	236,740

The upper Crystal Springs dam, since the building of the great concrete dam, has been used to carry the county road and also to form a settling basin for the more turbid waters of the southern part of the lake. Its value is no longer that of a dam, but of an embankment. Hazen has estimated it both ways; the figure above is of a dam, and he has made compensation later by estimating heavy depreciation.

The Pilarcitos and the San Andreas dams are constructions of the first class in point of excellence. They are perfectly water-tight. The fault-line of the great earthquake of 1906 passed through the San Andreas dam, so that the waste tunnel was distorted to an S-shape, without impairing the structure.

Hazen's figures on the dams are well-supported and might well be adopted. I feel some doubt, however, on his figure for embankment, 65 cents per cubic yard on Pilarcitos, San Andreas and the San Mateo clay dam, and 60 cents for the upper Crystal Springs. This doubt arises from the testimony of Ellis, whose estimate is 50 cents. I cannot follow him that far, but follow my practice of giving some effect to a doubtful state of mind. I adopt a figure of 65 cents for the small clay dam, 60 cents [147] for San Andreas and Pilarcitos embankments, and 55 cents for the upper Crystal Springs. In other items I adopt Hazen's figures. The result is a deduction from Hazen's estimate of earth dams, \$948,841, of \$40,322, on account of embankment, and \$1391,

extra lumber covered later in stock on hand, making the estimated cost \$907,128.

The deduction to be made from the estimate for the Crystal Springs upper dam, \$261,300, is \$9,797, leaving that item \$251,503.

The parties agreed on the item of lumber in place in flumes at \$183,000. Hazen's average figure for flume benching was 86 cents; Herrmann, 96 cents; Martin, \$1.03; Lawrence, partial, 65 cents; Ellis, 58 cents; Dockweiler, 44 cents; Dillman, 46 cents. I adopt 76.2 cents from my consideration of the evidence. We then have:

Lumber in place, as agreed.....	\$183,000
104,991 cubic yds. benching at .762.....	79,900
Miscellaneous, including clearing, caulking and tarring	15,148
	<hr/>
	\$278,048

Following the parties' classification in the major group schedule, the cost new of the item earth-dams and flumes is thus \$1,185,176, and of Crystal Springs upper dam \$251,503.

Tunnels

The estimates for tunnels are:

Hazen	\$1,124,095
Lippincott	1,100,757
Dockweiler	833,963
Dillman	650,183

[148] Hazen's experience has been with Eastern work, and therefore without direct contact with construction in a mining state, which might be expected to be characterized by a special facility. He has, however, handled the problem with his usual care and thoroughness, and has studied the experience of the company. His figures are corroborated by the estimates of J. B. Lippincott, of Los Angeles, an engineer of wide experience on the Pacific Coast, formerly assistant chief engineer of the Los Angeles aqueduct, and acknowledged by the defense to be "one of the best qualified men in the state on tunnel-driving" (Arg., 1498). Mr. Lippincott's estimate, unlike the others, represents what in his view it would cost to do the work on a day-labor basis, and to be comparable should be increased by an amount representing contractor's profit. Mr. Dockweiler had some early experience

with sewer tunnels in Los Angeles. Mr. Dillman has had much experience with railroad tunnel work and with some unlined small tunnels at Oakdale, but none with lined tunnels. The problems presented by small lined tunnels are quite different and were apparently not appreciated by the city's witnesses. There is no useful purpose to be served in discussing the questions at issue presented by a voluminous record. My reading of the record and of the arguments does not change the impression I had after hearing the evidence, namely, that Hazen's estimate was a conservative one. I adopt the round figure of \$1,100,000.

Buildings Outside the City

This title refers to certain, not all, of the buildings outside the city. (See Arg., 750.) Others are covered elsewhere. [149] The estimates were:

Hazen	\$152,310
Dockweiler	147,656
Dillman	151,299

During the hearing, the parties agreed on a figure of \$150,000. (Exhibit 140.)

Pumping Stations

These costs were fixed by agreement at \$633,000 for pumping stations outside the city, \$542,000 for those in the city, total \$1,175,000 (Exhibit 152); from which is to be deducted \$82,430 for buildings outside the city covered in the preceding title. The figure to be adopted is therefore \$1,092,570.

Crystal Springs Concrete Dam

The estimates of the cost of reproduction are:

Hazen	\$1,754,176
Lippincott	1,648,786
Dockweiler	1,194,816
Dillman	1,319,447

The concrete, or lower Crystal Springs dam, is 154 feet high, 600 feet long, and contains 157,200 cubic yards of concrete. Designed and built by Hermann Schussler in 1887-90, it is composed of a great number of huge interlocking blocks of concrete, built in place alternatively, checker-board fashion, with centers opposite adjacent joints. This was to allow movement along the joints,

rather than through the concrete, incident to the inevitable shrinkage attending the setting of the concrete, and to any [150] settlement that might occur, or to earthquake movement. (5883.) None of the witnesses have, in their estimates, figured on an exact reproduction in this regard. Hazen thinks the horizontal joints unnecessary, but has allowed for vertical joints, though fewer in number. (5883, 5437.) An estimate based upon the actual plan of construction would be higher, and to this extent, therefore, Hazen is liberal to the city. Whether the engineers are right in thus departing from the Schussler plan is of no interest here; but the fact should be noted that the dam parallels at a short distance the fault-line through the Crystal Springs Valley, upon which the slip occurred which occasioned the great earthquake of 1906. The dam was not injured in the slightest, though thus exposed to very violent earthquake strains. (5418.) Hazen says of this dam:

“It is a magnificent piece of masonry construction. After standing exposed to the weather for 25 years, and having gone through the earthquake, it is in as good condition as could be expected of a dam that was finished last week. There is not a defect in it. It is tight; it is a very creditable performance.” (5436.)

The principal difference between the estimates concerns the unit cost per cubic yard to be assigned to concrete in place. The figures are:

For plaintiff,	Hazen	\$9.00
	Lippincott	8.36
For Defendant,	Dockweiler	6.00
	Dillman	6.90
	Newman	6.18 (or 6.49)

[151] Hazen's, Dillman's and Dockweiler's figures are estimated contract prices; Lippincott's and Newman's figures are on a day-labor basis. It is difficult to compare the figures of Hazen and Lippincott; for while the latter does not include an estimate for contractor's profit, he does include certain items of indirect or auxiliary expense that do not appear in Hazen's figure. My view is that on the same basis Lippincott would be higher than Hazen.

It may be noted that the evidence shows that excluding the cost of raising the dam in 1911, and excluding also overhead and administration expenses, but including engineering and supervision, the dam cost originally \$1,946,170. (5433-36.) Hazen points out

that his estimate of present reproduction on similar bases of comparison, is \$62,000 higher than the cost. This practical identity is due to the fact, he says, that while labor costs are higher, the price of cement has gone down; and improvements in methods and equipment also would effect economies. In that regard, the use of motor trucks in the estimate is of doubtful application, especially as regards the earlier years here in controversy; for the evidence shows they were not in use in San Mateo county until 1912. The opposing tendencies, Hazen says, may be regarded as equalizing each other so as to make present day costs practically the same as original costs.

As compared with contemporary dams elsewhere, the construction of the dam in the period 1907-15 would suffer under a local handicap. A railroad could not economically be built; hauling charges thus are increased. There is no sand on the peninsula, and it would have to be brought from a distance, probably from Niles. [152] Modern practice in concrete dam-building dictates the use of large rocks called "plums," imbedded in the concrete to form what is termed cyclopean masonry. Such plums are not to be found in the vicinity. The total amount of the handicap expressed in figures is \$2.00 per cubic yard of concrete.

I have reviewed the evidence with care in the light of the arguments, and am entirely clear that the figures of the city's witnesses are inadequate and quite discredited by the cross-examination. The estimate of Hazen seems to me entirely fair and reasonable, and I adopt it. There are certain corrections. The inventory was incorrect by transposing quantities of grouted and ungrouted rip-rap in the Howard cut. The correction involves a deduction of \$3026 from Hazen's total of \$1,754,176. The plaintiff also conceded on the argument that \$1900 for boats should be deducted, these having been bought during the period and charged to operating account. The revised figure is thus \$1,749,250.

Sunol Filter Beds and Buildings

Niles Aqueduct

The estimates are:

	Hazen	Dockweiler	Dillman
Sunol filter beds.....	\$393,072	\$267,800	\$234,083
Sunol filter buildings....	5,423	5,758	150
Niles aqueduct	93,603	78,585	93,566

I adopt Hazen's figures. The wrought iron pipe in the Niles aqueduct has been covered in the prior item, wrought iron pipe outside the city.

[153]

Submarine Pipes.

The water from the Alameda sources is carried under the bay of San Francisco at Dumbarton Point by submarine pipes, two 22-inch outside diameter, and two 16-inch O. D. The smaller pipes were laid in 1887-88; the others in 1901-2. The length of each 16-inch line (including that under Newark Slough) is 6781.5 feet; of each 22-inch line, 6800 feet. (Inventory, Exhibit 11.) The tubes are of lap-welded steel, made in Pittsburg. These were galvanized inside and out and then coated inside and out with the Schussler asphaltum coating to resist corrosion by fresh water inside and salt water outside. A nipple on one end and a bell on the other, of cast-iron carefully machined for an exact contact, were then shrunk on and riveted to the steel tubing, and the joints between the tube and the castings carefully caulked and tested so as to be water-tight under pressure. In this condition they were transported to the pipe-laying barge in the bay at the site of the lines. There were actually three barges used; just how their work was co-ordinated does not appear, but probably one for laying and the others for transportation. The laying barge operated along a steel cable stretched across the bay, and was held in position by three lines on each side from capstans to anchors. Here the prepared lengths of pipe were put together on double inclined racks at the stern, and the joints formed by bells and nipples run with a very heavy lead joint; the pipe being thus made flexible and also water-tight. Thus finished, the pipe was lowered into the water as the barge moved ahead, being supported to the bottom by heavy tackle. The greatest depth [154] of water at the crossing is something over 50 feet; and according to the profile, about 2,000 feet of each line is deeper than 30 feet.

The laying of submarine pipe is considered extra-hazardous work; accidents happen, says Hazen, that cannot be anticipated, and the work often has to be done over because of leaks. (4832.) The tidal currents and wind are here serious obstacles. Diver work is frequently necessary, and the cost of this increases very much in depths below 30 feet. (4834.) I quote Hazen further:

“Submarine pipes do leak frequently. The possibility of leakage is a very important element in considering

what they are fairly worth. In this case the Risdon Iron Works guaranteed the tightness of these pipes and 25% of the money they received was held back for a considerable period until the tightness of the pipes was demonstrated. * * * Submarine pipes frequently fail to be tight under similar contracts, and contractors have been unable to get their money because they could not make them tight. It is possible to caulk some small leaks; generally speaking, a bell of this kind full of lead cannot be very well caulked. It can be corrected if it is one joint by putting a split sleeve over it; that is the common remedy. * * * One joint of that kind may cost several thousand dollars. If there are many joints that leak, ordinarily the line is abandoned. A great many submarines have been abandoned because they leaked. Sometimes they are taken up and the material used over again, so far as it is suitable, in new lines. It is because of the likelihood of leakage and the great cost of repairing it that this work is regarded as extra-hazardous; a contractor ought to expect to make a much larger profit on it than on ordinary work that is not so hazardous." (6017.)

Both lines were laid by the Risdon Iron Works, of this city, now and since 1911 out of business. Hazen characterizes the construction, both as to cost and as to successful results, as a very creditable performance. "The pipes have been tight; there has been no repair to them whatever since they were laid. They are believed to be perfectly tight at the present time. [155] That in an almost unequalled record." (4770.) Apparently no diver work was necessary (4835); and the contractors, by very skilful handling, had very little trouble in the way of accidents. (4837.)

The actual cost of the 16-inch lines is not known. Dorward estimates the cost of the 22-inch lines at \$225,000, but this is too low. Hazen determined from actual records of payments an actual cost (partial), with dipping estimated, of \$231,592; (Exhibit 98q). This included a bonus, probably for completion ahead of time, of \$4725; and in comparing with a reproduction estimate, this should be omitted. Painting castings, final testing and minor and incidental expenses not shown in contracts would raise this figure, Hazen thinks, to \$240,000.

The reproduction cost estimates were :

	22-inch	16-inch
Hazen, first estimate.....	\$262,000	\$165,000
Hazen, second estimate.....	259,200	164,300
Dockweiler	194,706	96,704
Dillman	183,114	101,730
Dorward	201,566	95,810

It developed during the hearing that in the matter of quantities involved, weights of metal, lengths, etc., there was not only a disagreement among the witnesses, but with all of them a departure from the quantities in the inventory. For example, both Dorward's and Dockweiler's lines, as estimated, are too short. Hazen examined the company's records, and made careful investigations and calculations. His lines are of the same length as in the inventory. His weights of tubes and bells exceed the [156] weights in the inventory. More tubes than the inventory shows were laid, and still more bought, to provide a surplus. I think Hazen is right in his facts. I ruled at the hearing, and shall abide by the ruling here, that the inventory will govern in view of the parties' disagreement. It is to be noted, however, that here (4765, 4780) as elsewhere in the inventory, there is no allowance for waste, for example, of cast-iron in the bells. That could be taken care of either in the unit price, or by adding to the inventory weights; Hazen has adopted the latter alternative. Furthermore, in any reproduction, spare tubes and bells would be bought. I have, however, taken the quantities in the inventory and Hazen's unit prices, prices he would not apply on those quantities, and so have gone under him in both respects,—perhaps not with entire logic, but in a spirit of conservative estimate.

Neither Dillman nor Dockweiler have had any experience with submarine pipe. The latter's estimate was carefully made, in his usual way of adopting quotations and of synthesizing labor costs on the basis of the actual progress made. There is thus no allowance for accidents or leaks, and an inadequate allowance for contractor's profit.

Dorward, however, had had experience with these very pipes and I have examined his evidence with great care. He was shop-foreman of the Risdon Iron Works when the smaller lines were made but had nothing to do with the laying; but he superintended both the fabrication and the laying of the 22-inch lines. The estimate he presents is his own only as to the laying; he com-

pletes his figure by taking Dockweiler's figures for the tubes, galvanized and dipped. His method is to reproduce original cost data by [157] reference to notes assembled by him from original shop-notes now destroyed; then to estimate decreases and increases in costs so as to apply to the period 1907-15. I have experienced great difficulty in following the transcript of his evidence, with a view to determining the validity of his calculations. I note some error in computation minor in effect.

Taking the cost of the 22-inch lines at something between \$230,000 and \$240,000, one naturally wonders how Dorward and Dockweiler effect a reduction in reproduction cost estimates to \$201,500 and \$194,700 respectively. The witnesses agree that materials would cost about the same, but that labor in the later period was more expensive and less efficient. Something would be gained in efficiency in the hypothetical reproduction, since the two twin lines would be laid successively; and something saved in the matter of equipment. The last item would not amount to much and would extend, so far as I can see, to such matters only as cable, anchors, etc. The barges would be rented by the month. The reduction seems to consist largely of a diminished calculation of contractor's profit and allowance for risk. Mr. Dorward himself made the estimate upon which the Risdon Iron Works made its bid for these lines in 1901, and it is transcribed at page 6012. In this contract, the water company furnished the tubes, galvanized and coated. An examination of the estimate is interesting.

The estimate is on 13,200 feet. The labor and material for each joint is first figured; then patterns, special machines and tools; then the barges and their equipment; then tug rental and labor laying pipe, board, superintendence, light, coal, etc. Then [158] follows "incidentals, \$3000," "add for labor, \$10,000," just what labor does not appear; "contingencies, \$10,000"; "incidentals" again, \$2000. This made \$107,295 for making and attaching the joints and laying the pipe, or \$8.13 per foot. The bid was \$10.90 thus showing a desired profit of 34%. We are not interested in these figures except as they illustrate how a contractor would protect himself in bidding on this class of work. It is the city's contention, voiced also by its witnesses, Dorward and Dockweiler, that the work having once been done successfully, would be done again by a contractor at a lower profit and with a lower allowance for contingencies. The answer is, first, that the fact that hazardous work has once been done without accident or loss

is no indication that this success will be repeated, else it could not be called hazardous; second, that the Risdon works had had experience in laying the 16-inch line, and yet, contrary to the hypotheses of the witnesses, provided abundantly, apparently, for unforeseen items in the second bid above referred to. Furthermore, in the absence of the contractor's books (Dorward's being only notes of shop-costs), we do not know what the profit actually was. It is quite likely that, as Dorward says, profits on iron work generally may have been less after 1910; but to allow only 25%, as he does in his reproduction estimate, to cover the whole period with no adequate allowance for extraordinary risk, is less than the evidence shows is warranted. The statement of Dorward that the extra hazard would be taken care of in the shop's customary 50%, shop-overhead on labor costs, is not convincing, in view of the fact that that item was intended to cover power, rent, clerks, etc., and was applied to the ordinary work of the shop, without [159] reference to extra hazard. I think also that Dorward, in his testimony here, underestimated the difficulty of the work. He did not have skilled mechanics on the barge when the pipe was laid (6003); and accordingly Mr. Schussler put his own men to work to pour the lead joints and do the caulking, while Mr. Dorward's men stood by. (6004.) He has not here estimated on skilled workmen being employed. (6004.) From what we have learned, it would seem that Mr. Schussler was right. Mr. Dorward does not think it likely that a leak could occur. (6005, 6007, 6011.) Hazen, with a much broader experience and knowledge, testified that leaks are the common hazard.

My conclusion is that Dorward's figures are too low to represent what would be the contract price of this work in 1907-15. They are given in such shape that I find it impossible to correct them.

I turn then to Hazen's figures as the only clear and well-sustained estimates in the record. His estimates are abundantly corroborated by other submarine work in the East and at Victoria and Portland. I note also that in 1914 a contract was awarded by the city of San Francisco for an 18-inch flexible cast-iron pipe for an outfall sewer at Baker's Beach at a price of \$18 per lineal foot. It is comparable only in a general way with the pipes under appraisal. The cast-iron is cheaper than the Spring Valley steel pipes, the tidal currents are probably stronger at Baker's Beach, but, on the other hand, leakage of the joints of a sewer would seem to be less important than in a water pipe.

Therefore, taking Hazen's unit prices, and quantities as [160] shown in the inventory, we have this computation for the 22-inch lines:

Pipe, 1,177,882 lbs. @ 4.5c f. o. b. San Francisco.....	\$ 53,005
Bells, including boring, turning, shrinking on and riveting, 942,200 lbs. @ 8c.....	75,376
Galvanizing 1,177,882 lbs. @ 1.5c.....	17,669
Dipping, as agreed	3,000
Lead, as agreed	10,700
Transporting, laying, testing and making tight, 13,600 ft. @ \$6.75 per ft.	91,800
	<hr/>
	\$251,550

In the same way, the 16-inch lines, 13,563 feet long, would cost \$162,914.

I adopt \$250,000 and \$160,000, respectively, as the fair reproduction cost of the two lines in the period 1907-14. This gives costs per foot of \$18.38 and \$11.80, respectively.

There must be added the fittings by which these lines are attached to the pipe lines on shore. The estimates are:

Hazen ..	\$23,695
Dockweiler ..	35,472
Dillman ..	20,830

I adopt Hazen's figure. The total for the submarine pipes and fittings is, therefore, \$433,695.

I note that Judge Farrington appraised these lines as of 1903 at \$435,900. (192 Fed. 175.) I have not, however, considered this fact in reaching my conclusion.

[161] Roads, Fences, Electric Transmission Lines and Ravenswood Wells

The respective estimates are:

Hazen ..	\$307,674
Dockweiler ..	333,636
Dillman ..	252,221

The parties agreed on an amount of \$287,500, of which \$11,500 covered the so-called Pleasanton ranch lands fences.

**Merced Drainage System—Merced Supply and Discharge Pipes—
Ocean View Conduit—Honda Supply Main—Central Pumps
Force Main.**

The estimates are:

	Hazen	Dockweiler	Dillman
Merced Drainage System.....	\$214,834	\$148,956	\$173,757
Merced Supply, etc., Pipes.....	103,093	90,023	81,350
Ocean View Conduit.....	21,000	28,745	Not valued.
Honda Supply Main.....	109,442	80,896	89,928
Central Pumps Main.....	37,731	34,778	36,456

These figures do not include tunnels, elsewhere grouped under that title and already disposed of.

For brickwork, concrete, etc., contained principally in the Merced drainage system, I have taken Hazen's figures. But since in my treatment of the subject of riveted pipes outside the city, I have found occasion to reduce Hazen's figures, it became necessary to check all items of riveted iron pipe contained in the above titles. I have as before applied my figures of 7.52 per pound, 70c for excavation, and 10% thereof for auxiliaries, etc., figures, [162] be it remembered, considered to represent an average throughout the system. Contrary to my expectations, my total result is \$17,000 higher than Hazen's of \$281,000 for these pipes. This is partly due to an error in Hazen's figure for the 30-inch Central Pumps force main, of about \$10,000 underestimate, pointed out by him (7609) but not corrected in his schedule. It is probably chiefly due to the fact that my figures represented reductions from Hazen's check estimate, based on weight, which with him gave higher results than his actual appraisal, based on a price per foot. It is the latter estimate I am here checking. Under the circumstances, I feel justified in accepting Hazen's estimate without change.

It may be noted that the Ocean View conduit is slip-joint pipe. This fact may not have been allowed for by Dockweiler.

City Reservoirs

The totals estimated are:

Hazen	\$865,817
Elliott ..	905,438
Dockweiler ..	594,273
Dillman ..	652,906

There is a great deal of evidence in the record which has been carefully considered. In general, I have followed Hazen's figures. I have reduced his figures on concrete from \$12 to \$10 per yard in one or two places, and also the figures on puddle from \$2.50 to \$1.50, though it must be said that the evidence to support this reduction is not very strong. In detail, the result is as follows:

[163]	University Mound	\$200,062
	College Hill	62,150
	Lake Honda	389,627
	Potrero Heights	26,053
	Lombard Street	38,116
	Francisco Street	63,742
	Clarendon Heights	16,133
	Clay Street	17,040
	Presidio Heights	23,925
	Oceanside Tank	2,023
	Meyer Tank	1,336
	<hr/>	
	Total	\$840,207

City Distribution Pipe System

The principal items are agreed, as follows:

Screw pipe	\$140,000
Cast iron pipe.....	4,013,000
Paving actually cut.....	223,000
Trestles	9,000
Gate valves and boxes (C. I. P.)...	148,000
Gate valves and boxes (W. I. P.)...	7,220
Stop cocks and boxes.....	2,000
Check valves and boxes.....	2,600
Air valves and boxes (C. I. P.)....	1,400
Air valves and boxes (W. I. P.)....	410
Blow-offs (W. I. P.).....	1,070
Meters	366,000
Services	96,000
	<hr/>

Total

\$5,009,700

[164] It is agreed that the reproduction cost of the existing paving over the city pipe system would be \$1,319,000; in other words, if the system were to be built in the period in question, that expense would actually be met. However, it is agreed that of

this amount, the paving which was, as a matter of history, actually cut and replaced, should be estimated at a reproduction cost (new, without overhead, etc.), of \$223,000. (9453, 9481, Exhibit 179.) This amount is therefore taken, without discussion, in deference to the ruling of the Supreme Court in *Des Moines Gas Co. v. Des Moines*, 238 U. S. 171.

I find that the reproduction cost of the following items, not agreed upon, would be as follows:

Wrought iron pipe	\$480,000
Tunnels (excluding Bernal)	11,966
Pipe in tunnels (W. I.)	24,000
Pipe on trestles (W. I.)	14,500
	<hr/>
	\$530,466

The total reproduction cost of the city pipe distribution system, as new, without overhead or interest costs, is therefore \$5,540,166.

[165]

Calaveras Dam

Whether expenditures of some half-million dollars, more or less, made up to December 31, 1913, upon this dam should be valued is a question that will best be deferred until the discussion of the proper elements to be included in the determination of the rating base. There is no dispute as to the amount, except in regard to the method of calculating interest.

Miscellaneous Structure Values

This title represents an *omnia gatherum*, odds and ends of structures, either not discussed or sparingly discussed in the evidence. The estimates are:

Hazen	\$408,665
Dockweiler	344,878
Dillman	474,192

Mr. Dockweiler erroneously omitted to value the so-called hop ranch buildings. The above figures include the so-called Pleasanton ranch houses, appraised by the three witnesses at \$170,141, \$129,121 and \$198,792, respectively, not accounting depreciation.

These are the buildings on the so-called Pleasanton ranch lands. They have no value for waterworks purposes, though conceivably

they may contribute to the company's income from agricultural operations thereon. In allowing the value of these expensive lands in lieu of water-rights at this point, I feel that I have gone as far as is just to the consumers, and so the buildings will be omitted from the capital upon which the return is to be [166] calculated. In view of Dillman's larger figure, it seems reasonable to accept Hazen's estimate for the remaining miscellaneous structures, viz., \$238,524.

Certain Further Exclusions from Structures

There have been noted or accounted for in the foregoing appraisal various corrections in the nature of exclusions from structures in use, following agreements between the parties at the hearing or during argument. These comprise lead in the submarine pipe appraisal, duplicated flume lumber, certain boats at Crystal Springs, correction of Hazen's appraisal of grouting at the Howard cut, and paving over city pipes. Not noticed before are the matters of paving over the mains outside the city, and the San Mateo clay dam, which was temporarily out of use in 1907-15. The reproduction cost new of the former item, as heretofore included by me, is \$31,751, to be deducted from the item "Wrought iron pipe outside the city"; and the clay dam, heretofore included under "Earth dams and flumes," at \$12,522.

There are other items of exclusions from structures, some disputed, some agreed. I shall take Hazen's Exhibit 97 as representative of the plaintiff's case, and Dillman's Exhibit 213, the city's case.

I have already referred to the exclusion of the Pleasanton ranch houses under the last title. Both witnesses also exclude the Pleasanton drainage canals north of the Arroyo Valle. Deduction will accordingly be made from "Structures not discussed" in the amount of \$58,000. (Exhibit 97, Table 25.) The Pleasanton fences, agreed to above at \$11,500, should not be excluded.

[167] The Ravenswood wells, it is agreed (Exhibit 137) should be valued new at \$35,000. They are not in use and no issue exists as to their exclusion. I hardly see why they have been included above.

Hazen also, in Exhibit 97, depreciates a small concrete dam in the Merced properties 100%. I shall exclude it at this point. This involves a deduction from the title "Lake Merced drainage system" of \$5,448.

The Niles aqueduct has no part in supplying San Francisco with water. It is necessarily maintained by the company to supply certain riparian owners on the Alameda creek, a burden which was part of the price for which riparian rights were released. Hazen accordingly deducts \$150,000, a round figure including overhead and less depreciation, from his adopted figure for Sunol water-rights in the calculation of the proper rating-base. (Exhibit 164, p. 29; Tr., p. 8367.) The logic of this procedure seems correct. I have already reached a figure for these water-rights, assumed as fully paid for and free from burdens. It seems simpler to deduct the Niles aqueduct now, without adding overhead or deducting depreciation. Accordingly, I deduct the prior item "Niles aqueduct, \$93,603." The pipe was part of the gross amount in the title "Wrought Iron Pipe outside the city"; there are 250 tons of 36-inch pipe, heretofore valued by me at \$46,160, with certain small items at \$1,076, a total of \$47,236. This will be deducted from the total pipe item.

[168] **Overhead and Interest During Construction**

In the preceding pages devoted to plaintiff's structures it has been evident that we have determined the reproduction cost of individual items of plant, or of classes of items; and this has been accomplished by finding fair contract prices for the work in question. Reflection will disclose that this does not tell the whole story; there are always other actual expenditures of money that cannot be assigned to a definite unit or class of structures, but must be included in an estimate of the cost of work to be built, or of the cost of reproduction of existing structures. Engineers, lawyers, executive officers, clerks, must be employed and paid, and many other expenditures incurred that are incidental to the work of construction, but are not made to the contractors. This is called overhead. And of course, the total cost is not accounted for unless we add interest upon all moneys paid out as above during the period of construction, whether that money be borrowed or invested by the owner himself. Interest during construction is often included in the general term "overhead."

The point I wish to emphasize is that these represent *actual expenses* during the construction period. They do not represent expenses after construction is complete and operation begun, either in the way of developing business or of meeting deficits. They are not percentage additions to cover possible errors in the esti-

mate, nor made in a spirit of liberality to cover assumed differences in reasoning from cost to value. When, therefore, the Supreme Court, in the Des Moines Gas case, recently [169] referred to the inclusion of overhead as one of the reasons for the exclusion of going value (238 U. S. 171), there is presented either a misapprehension of the usual meaning of the term overhead, or an actual or a mistaken indention of it with those development expenses which arise during operation and subsequent in time to the overhead expenditures. For the inclusion of actual costs in the nature of overhead has no more to do with the allowance or disallowance of a going concern value, than has the inclusion in the appraisal of an allowance for interest paid, or for the cost of concrete or pipe in the system.

Overhead and interest are normally accounted for by the addition of a percentage of the estimated cost of structures. The amount of the percentage to be added for overhead will vary according to the appraisal methods of different engineers, and also according to the character of the construction under estimation, whether waterworks, railroad, etc., and also very materially according to the magnitude of the construction under estimation. It follows that it is useless to attempt to apply precedents as to this amount from other decided cases, for ordinarily it will be impossible to know how the basic unit costs have been derived, and furthermore, the nature and amount of the construction involved will frequently make the cases non-comparable.

Since interest must be paid upon overhead as well as upon expenditures to contractors, the percentage adopted for interest during construction should logically be compounded upon the percentage for overhead. The various estimates offered in evidence follow:

[170]	Overhead	Interest	Compounded total
Hazen	15%	12 %	28.8%
Metcalf	15%	12 %	28.8%
Dockweiler	11%	8.9 % Int.	} 21.9%
		.9 % Taxes	
Dillman	10%	5.82%	16.3%

The fact is obvious that in taking care of overhead and interest by a percentage addition—the only possible way—a variation of even 1% will affect the valuation by a large amount, perhaps two hundred thousand dollars. I have therefore given close study

to all the evidence to the end that I shall adopt figures that are not too high, and, equally important, not too low. And it must be remembered that the burden of proof is upon plaintiff.

But this burden has been easily sustained, here as elsewhere, not only because of the strength of the plaintiff's evidence, but because of the weakness of the city's case. Hazen's description of the fair basis of an estimate of interest during construction may be applied to overhead as well; it should rest upon "broad, general experience backed up by reliable statistics." (7646.)

Neither Dockweiler nor Dillman have had this "broad, general experience." It has been seen that Dockweiler has had little construction experience of any kind. Dillman's experience has been considerable, but not generally with comparably large projects, or with waterworks construction. Even so, with the experience he has had, his testimony would have been helpful, except for his characteristic distaste [171] for close analysis, and for the statistical records of comparable construction. His testimony on the overhead allowance, boiled down, is that he uses 10% because that has been his practice, tested by experience; to which he adds comments and statistics of railroad construction, quoted from a book on valuation, and the figures agreed by engineers in the valuation of the local gas company. Overhead on a gas plant has no comparable relation to overhead on waterworks construction. The former has become standardized as to engineering problems; the latter has not. Moreover, water supply involves study of alternative sources; and local differences exist between different cities. (See Hazen, 7617.) The witness has apparently made no study of comparable waterworks constructions.

Dockweiler has done better in this regard in that he has studied the statistics of the Los Angeles aqueduct and of the San Francisco high pressure water system; this to determine the amount accountable to engineering. His studies did not extend to the other elements in overhead shown by those works.

There are several reasons why I find Hazen's presentation most satisfactory. His experience has been wide; he has made a careful study and a clear presentation of his reasons; he is corroborated by Metcalf and by the statistics of numerous waterworks cited by both. And in addition to this, there is an inevitable correlation between the unit prices and the overhead allowance in any consistent appraisal of structures by reproduction-cost estimates. Since generally I have followed Hazen's figures, it would be consistent to

adopt his overhead allowances. On this [172] correlation see Hazen, 7617 *seq.*, Metcalf, 7650. Hazen speaks several times, for example, of the importance of good engineering, such as is represented in the Spring Valley system, to attain given unit prices; and this must be allowed for in overhead.

“The engineering affects the unit prices; it affects the quantity of materials; it affects the excellence of design; it affects the quality of materials; it affects the extras and contingencies; it affects everything. If we take the engineering on the Spring Valley work as 10%, and you have a certain result, and supposing you try to cut our engineering outlay in half, what is the result? Instead of spending \$100 on construction, you might spend \$120 or \$130 or \$150. In other words, you would build structures not well adapted; you will have more unit quantities; the unit prices may be more or less, because with poorer engineering they might be less good quality, and there might be a cutting of prices to correspond with it; I should expect with cheaper engineering, that you would have poorer structures and that they would cost more.” (7782.)

Metcalf classifies the usual allowances for overhead, including interest, as follows:

- “1. Preliminary expense of incorporation and promotion.
 2. Engineering and superintendence expenses.
 3. Legal expenses.
 4. Administration expenses.
 5. General and miscellaneous expenses.
 6. Discount and cost of marketing securities.
 7. Contingencies, omissions, etc. [173]
 8. In some cases, interest-during-construction cost, though the latter is here, and ordinarily, accounted as an independent item of expense.
 9. Taxes-during-construction, though this item is sometimes accounted in the development expense.”
- (7659 and see 7660 *seq.*)

In his 15%, Hazen excludes item 1, preliminary organization and promotion, because he has no data or knowledge on such expenses (7611, 7774); if not too great, the 15% might cover them, but practically he has disregarded them. The data he presents, referred to later, do not include preliminary *engineering* expense, but in his judgment, 1% should be allowed for that. (7778, 7616, 7613.) “It is a matter of my experience that something like four projects are considered, discussed, and estimated upon for

one that is actually carried out." (7612.) It seems to me that item 5 above, "general and miscellaneous expense," is a useless repetition of matter that would be comprised in engineering, administration or legal expense. Hazen does not refer to it. "Discount" is by Hazen and Metcalf referred to in connection with the proper rate of return. As to "Contingencies, omissions, etc.," omissions are apparently not considered in view of the full stipulated inventory; contingencies are reflected by Hazen in his unit prices. There are, it is true, contingencies that would not be included in the contract prices, as pointed out by Metcalf (7663). Considering the way he has derived his figures, *i. e.*, largely from costs of completed work, it is probable that Hazen's 15% may include an allowance of this character. Taxes I shall consider covered by an overhead allowance, at least to the completion and operation of any portion of the system. In other respects, I shall include [174] in my figure for overhead the matters indicated as included by Hazen.

Hazen selects four waterworks projects as most helpful to his judgment. I shall not attempt to brief his discussion of them. (See 7621 *seq.*); but I quote his summary of what they show (Exhibit 155, p. 1):

Board of Water Supply, City of New York:

\$135,000,000	1905-15	Land only	Structures only
Engineering and administration.....	43.08%	14.56%	
Interest @ 4.30% and taxes during construction	37.15%	18.02%	
Total overhead	96.23%	35.20%	

Metropolitan Water Board of Boston:

\$23,600,000	1896-1906,		
Engineering and administration.....		16.65%	
Interest @ 3.10% during construction....		* 9.42%	
Total overhead		27.64%	

Cincinnati Water Works Improvements:

\$11,000,000	1897-1908,		
Engineering and administration.....		*12.72%	
Interest @ 3.75% during construction....		*15.24%	
Total overhead		29.90%	

Little River Works, Springfield, Mass.:

\$2,000,000	1907-08,		
Engineering and administration.....		14.30%	
Interest @ 3.5% during construction, about		3.50%	
Total overhead, about.....		18.3%	

*Calculated on structures and land taken together.

[175] Hazen's adopted figures of 15% overhead and 12% interest are figured on structures only, not including land. We have considered the Minnesota Rate case as disapproving the allowance of interest and overhead in finding the value of land in rate-fixing proceedings (*ante*, pp. 27, 51); it is interesting to see that New York city, over and above condemnation awards with included interest, paid 96.23% in total overhead expenses on land. In smaller systems it would, of course, be less.

Metcalf (Exhibit 156) gives statistics of many other water-works constructions as justifying the allowances of 15% and 12%.

I might well accept the 15% figure of these engineers. It represents a trained and fair judgment, backed by statistics. My own interpretation of these statistics would be worthless. But I shall, as elsewhere, give effect to certain doubtful matters, which, if I were not sitting in judgment, I would disregard in deference to the opinion of trained minds. One such matter is the expenditure for police, which in the New York construction amounted to 2.18%, and which was a substantial item in the Boston work. Hazen thinks it would be involved also in a reconstruction of the Spring Valley works, though it would be less than in New York. (7798.) The evidence, such as it is, seems to show that in this state no additional expenditure for police would be required, at least not in large figures. I have also been disposed to give rather more direct effect to the figure which Hazen and Lippincott derived as the total overhead incurred in the building of the Los Angeles aqueduct, 13.7%. (Exhibit 138.) This seems not to have been discussed in connection with the evidence on overhead. In [176] view of these considerations, a figure of 14% seems fair.

In reaching the allowance for interest-during-construction, Hazen, Metcalf and Dockweiler assumed that the money would cost 6%, Dillman 5%. Assuming a company starting in business, 6% is as low as we can reasonably figure, as Dockweiler says. (7765.) All the witnesses assume as the time of construction five to six years. Hazen and Metcalf estimate two years as the average period upon which interest would be paid upon the full amount, thus obtaining 12%. This seems reasonable and I adopt it. This figure of interest assumes that parts of the system will go into operation when ready, and leaves part of the interest charges to be disposed of in the determination of development expense. That will have to be considered when we treat the question of going value.

The percentages to be added are, therefore, overhead 14%, interest 12%, or a total of 27.68%.

Summary Gross Reproduction Cost of Structures, 1913, Including Overhead and Interest

We may now summarize the preceding pages. The totals given in the preceding discussion by groups will first be given, then the supplementary deductions, then the total overhead at 27.68%, and then the total reproduction cost, new, including overhead and interest. The depreciated value of stock-on-hand has been agreed, and the addition of that figure will be made after the amount of accrued depreciation is determined and deducted. The Calaveras dam will also be considered at that point. The figures follow:

[177]

		Repr. cost no over- head	Overhead and interest 27.68%	Total Repr. cost
1. W. I. pipe out- side	\$3,304,990			
Less paving.....	31,751			
	<u>3,273,239</u>			
Less Niles Aq..	47,236	\$3,226,000	\$ 892,956	\$ 4,118,956
2. Earth dams and flumes	1,185,176			
Less clay dam...	12,522	1,172,654	324,590	1,497,244
3. Tunnels ..	.....	1,100,000	304,480	1,404,480
4. Buildings ..	.....	150,000	41,520	191,520
5. Pumping stations .....	.....	1,092,570	302,423	1,394,993
6. Crystal Springs concrete dam .	.....	1,749,250	484,192	2,233,442
7. Crystal Springs upper dam ..	.....	251,503	69,596	321,099
8. Sunol filter beds.....	.....	393,072	108,772	501,844
9. Sunol filter buildings.....	.....	5,423	1,501	6,924
10. Niles aqueduct .....	.....	omitted		
11. Submarine pipe .....	.....	433,695	120,046	553,741
12. Roads, fences, El. lines, Ravens- wood wells ..	287,500			
Less wells	35,000	252,500	69,892	322,392

		Repr. cost no over- head	Overhead and interest 27.68%	Total Repr. cost
13.	Merced drainage system 214,834			
	Less concrete dam 5,448	209,386	57,958	267,344
14.	Merced supply pipes.....	103,093	28,536	131,629
15.	Ocean View conduit.....	21,000	5,812	26,812
16.	Honda supply main.....	109,442	30,283	139,725
17.	Central pumps main.....	37,731	10,444	48,175
18.	City reservoirs	840,207	232,569	1,072,776
19.	City distribution pipe system	5,540,166	1,533,518	7,073,684
20.	Structures not discussed 238,524			
	Less drainage canals 58,000	180,524	49,969	230,493
Grand totals		\$16,868,216	\$4,669,057	\$21,537,273

[178] It should, of course, be noted that the percentage adopted for overhead expense and interest-during-construction, 27.68%, is applicable as an average to the entire construction cost, and would not apply with entire correctness to any item or group of structures; the computation, for convenience, on the latter basis, should not, therefore, mislead the reader.

Depreciation

It is a fact familiar to our every-day observation that any aggregation of capital assets changes in the value of its elements with the passage of time. Landed assets appreciate or depreciate according to the law of supply and demand, usually, in our common observation, in the direction of appreciation. Structures appreciate or depreciate with the rise or fall of materials or labor; but in addition to the varying influence of these cost factors, there is active, in the case of most structures, a continual depreciation in value due to corrosion, wear, or loss of economic usefulness. The depreciation may be physical, due to decay; the rusted pipe caves in; the flumes rot through. It may, on the other hand, be functional, effective although physical decay has not progressed to the limit; the depreciation comes through obsolescence or inadequacy. A pump, become obsolete by changes in the art of manufacture, will be abandoned while still in good order, if

economies in operation will be effected by a change. Or the pump may become inadequate, though physically good and modern in type, through change in the demands which the system may make upon its service.

[179] Obviously, under any theory, the losses of capital through depreciation must be made good by the returns from the production of the aggregated capital, the sale prices of its goods or its service. The process of replacing depreciation in value is called amortization.

Let us revert for a moment to the controversy as to whether original cost or present value shall be the basis for rating returns to the owner of property engaged in public service. As stated, the original cost theory finds its justification in the socialistic basis, that the investor's reward should be measured by, and an interest return calculated upon, the amount originally sacrificed, the actual investment. How would the facts of depreciation be met under that theory? An amortization would have to be provided by the rates so that the investment would remain intact; no theory can displace the operation of physical facts. But the investor's reward or profit would remain constant while capital sacrificed remained the same. In other words, neither appreciation nor depreciation of capital assets, land or structures, would then enter the problem. The integrity of capital would have to be guaranteed. Our rating base would be the amount invested, irrespective of changes of value or of abandonments. It must be evident that this socialistic basis is at variance with our whole economic structure, and would only be justified by operation without thought of profit, as might be the case under public ownership. However, the controversy has been closed by the Supreme Court.

When the owner's return by way of profit is based upon [180] the present value of his property employed in the public service, it follows that land or structures that have in fact appreciated in value will be allowed that increase, *Willcox v. Consolidated Gas Co.*, 212 U. S. 52; *Minnesota Rate Cases*, 230 U. S. 454; and, with entire consistency and justice, structures that have depreciated in value by lapse of useful life or change in conditions, will be rated for purposes of return, at their diminished worth. *Knoxville v. Knoxville Water Co.*, 212 U. S. 10; *Minnesota Rate Cases*, 230 U. S. 456-8. The Knoxville case, decided in 1909, was the first to announce this rule, and concurrently, the correlative rule that

the wasting value should be periodically amortized in the rates for service. The engineers of the country were thus set to thinking upon the proper methods of estimating depreciation and its amortization, and there is considerable current literature on the subject, notably the report of the special committee on valuation of the American Society of Civil Engineers, whose final report was presented to the society on January 17, 1917. The record in the case at bar is a valuable and effective presentation; as was also the record in *Contra Costa Water Co. v. City of Oakland*, tried between 1909 and 1914, in this court. The report of the present master in that case, made in October, 1916, was, so far as I know, the first in which the various present-day methods of accounting depreciation were judicially considered. The court has not passed upon that report as these lines are written.

Questions relating to depreciation present themselves in two aspects. One is the accounting problem, viz., by what mathematical method shall the capital value be written off to account for depreciation in value, and the allowance made in the rates to offset this loss of capital. In the other aspect, emphasis is laid first upon a determination of the *present depreciated value* of the aggregated capital, and then the examination shifts to the problem of determining the method by which, in present and future years, a fund shall be built up sufficient to replace those structures when the remaining lives terminate. This distinction is most important, as will appear; and the failure to observe it will cause injustice and confusion of thought. Before going further it is necessary to consider, as briefly as may be, several methods of accounting and amortizing depreciation; I shall discuss four. All of this is purely theoretical, a matter of mathematics, having no *necessary* relation to the facts of depreciation.

These methods can be most clearly shown by tables of figures. To construct a table it is necessary to make certain unreal assumptions. The first of these is that the plant consists of one unit of structures; the fact being that every plant contains many such units having different rates of depreciation and different useful lives. And in practice, the computation of depreciation must be made for each such unit. The second is that the cost of the structure originally will represent the cost of its replacement, in other words, is constant throughout its life. This obviously is not true. Uncertainties as to lives and interest rates will be referred to later. Let us, then, assume a plant consisting of one unit, whose cost of

installation [182] and replacement is \$100,000, and whose life is ten years; and that a proper rate of interest to use, both for the investor's return applicable to dividends, and for sinking funds, where established, is 6% throughout the period. The ratepayer must obviously pay the investor, as his reward for public service, \$6000 each year for the ten years of the plant's life, and also the \$100,000 necessary to replace it; along, of course, with the cost of operation, including taxes and repairs. By what system of accounting will the investor's returns and the amortization or paying-off of depreciation be accomplished?

The most obvious way is to pay for the depreciation when it is complete; the old unit is abandoned, the replacement is made and as concurrently as may be, the rates for that year are increased by the gross amount thereof, \$100,000. This is the so-called *Replacement Method*. The table of payments would run as follows:

Replacement Method.

Year	Rating base at end of year	Depreciation allowance	Owner's return	Total ratepayer's payments
0.....	\$100,000			
		0	\$6,000	\$6,000
1.....	100,000			
		0	6,000	6,000
2.....	100,000			
		0	6,000	6,000
3.....	100,000			
		0	6,000	6,000
4.....	100,000			
		0	6,000	6,000
5.....	100,000			
		0	6,000	6,000
6.....	100,000			
		0	6,000	6,000
7.....	100,000			
		0	6,000	6,000
8.....	100,000			
		0	6,000	6,000
9.....	100,000			
		100,000	6,000	106,000
10.....	0 } 100,000 }			
Totals.....		\$100,000	\$60,000	\$160,000

[183] Obviously, though the unit of plant has been growing older each year and has been depreciating in worth, not perhaps for service, but certainly for purposes of sale, the book value or rating base must remain the same, because the community has paid nothing on account of replacement; and interest must be paid on undepreciated value or a confiscation results. The replacement method would be impracticable in the case illustrated, for no community could or would stand a raise in rates from a total of \$6000 per year for nine years in every ten, to \$106,000 in every tenth year. If, however, the plant is composed of a multitude of units of approximately equal lives, short in total duration, and built and going out of use uniformly in successive years, the replacements each year would be the same, and the method would theoretically be practicable. In such case there would always be some depreciation in worth for sale purposes, but the returns to the investor would have to be on undepreciated value, the Knoxville decision to the contrary notwithstanding.

Now suppose the investor-owner of the plant in question decides that it is unsafe to rely on his consumer's obligation or ability to pay him the \$100,000 for replacement in the tenth year. He concludes that he will collect each year a sum on account, in equal instalments. But here the interest principle comes into play; money must be deemed as earning interest in the hands of its possessor. He knows of safe securities which will return him 6% a year. Accordingly, he decides to establish a sinking-fund for replacement purposes, and his problem is to determine the amount to be collected each year from the ratepayer, which invested at 6% compound interest will amount to [184] \$100,000 at the end of ten years. A book of sinking-fund tables will show this sum to be (approximately) \$7587. In the following table the ratepayer pays each year the sinking-fund annuity to amortize depreciation, \$7587, and interest on the book assets or rating base, \$6,000; a column is inserted to show interest earnings of the sinking-fund.

Sinking Fund Method.

Year	Rating base at end of year	Payment to sinking fund	(Sinking fund) (Int. at 6%)	Owner's return	Total ratepayer's payments
0	\$100,000				
		\$7,587	(.)	\$6,000	\$13,587
1	100,000				
		7,587	(\$ 455)	6,000	13,587
2	100,000				
		7,587	(938)	6,000	13,587
3	100,000				

Year	Rating base at end of year	Payment to sinking fund	(Sinking fund) (Int. at 6%)	Owner's return	Total ratepayer's payments
4.....	100,000	7,587	(1,449)	6,000	13,587
5.....	100,000	7,587	(1,991)	6,000	13,587
6.....	100,000	7,587	(2,566)	6,000	13,587
7.....	100,000	7,587	(3,175)	6,000	13,587
8.....	100,000	7,587	(3,821)	6,000	13,587
9.....	100,000	7,587	(4,505)	6,000	13,587
10.....	100,000	7,587	(5,230)	6,000	13,587
Totals.....		\$75,870	(\$24,130)	\$60,000	\$135,870
		\$100,000			

The total cash payments made by the ratepayer, in addition to operating expenses not shown, are thus seen to be \$60,000, the owner's reward in interest for his service, the amount available for dividends, and \$75,870, sinking-fund annuities to amortize depreciation, a total of \$135,870 in actual cash. But [185] since the consumer has parted with his money in advance of the necessity of actual replacement, he must be credited with compound interest thereon, that is, the earnings of the sinking-fund, amounting to \$24,130 at the end of the ten-year period. He has satisfied his obligation to provide the full replacement payment of \$100,000, and with the payment also of \$60,000 available for owner's dividends, has, as in the replacement method, in effect paid to the owner the sum of \$160,000 which the hypothesis underlying the illustration requires.

It is to be noted that the owner's interest return of 6% annually must obviously be based upon the undepreciated value of the assets, \$100,000, throughout the period. The reason of this is because neither of the ratepayer's two classes of payments is a return of capital. Obviously the interest payments are not. The sinking-fund annuities are not, because the interest which they earn are credited to the ratepayer in satisfaction of his obligation to replace the wasting assets.

I have assumed a 6% rate of increase for the sinking-fund purely for the purpose of illustration. If the sinking-fund annuities

were invested in securities of absolute safety, 6% would not be earned. This method of amortization does not, however, require the establishment of a sinking-fund in the shape of securities. The annuities can be used by the owner for capital additions to plant, and thus will earn at the rate on capital, which may very probably be 6%, an arrangement beneficial to both parties. The owner will of course then have to meet replacement of the original unit out of his own pocket by new capital. The [186] books will be kept in exactly the same manner as if the sinking-fund were in securities. It should be remarked that the plan of investment in plant will work out to produce 6% compound interest throughout the period, that is, the assumed investment return, only if continuously employed in new additions; for if the fund has idle money for any period of time or money invested in low-interest bonds, a most likely situation, the 6% rate will not be earned in fact.

Let it be remembered that we are not considering now the changing value of the plant; but only methods of amortization, of paying-off the ratepayer's obligations through a term of years. This is a pure matter of mathematics, of bookkeeping.

Now suppose we desire to recognize in our bookkeeping, in some way, the fact that the unit of structure is decreasing in actual value. If we assume that the annual decrease is equal to the total yearly addition to the sinking-fund, we get a modification of the sinking-fund method of amortization, with equivalent results. The table follows (figures being approximate):

Modified Sinking-Fund Method.

Year	Rating base end of year	Payment of depreciation	Interest return	Total ratepayer's payment
0.....	\$100,000			
1.....	92,413	\$7,587	\$6,000	\$13,587
2.....	84,371	8,042	5,545	13,587
3.....	75,847	8,525	5,062	13,587
4.....	66,811	9,036	4,551	13,587
5.....	57,233	9,578	4,009	13,587
6.....	47,080	10,153	3,434	13,587
		10,762	2,825	13,587

[187] *Modified Sinking-Fund Method* (cont'd.)

Year	Rating base end of year	Payment of depreciation	Interest return	Total ratepayer's payment
7.....	\$36,318			
8.....	24,910	\$11,408	\$2,179	\$13,587
9.....	12,818	12,092	1,495	13,587
10.....	0}	12,818	769	13,587
.....	100,000}			
Totals.....		\$100,001	\$35,869	\$135,870

Compare this table from a purely formal or mechanical standpoint with the sinking-fund table preceding. The third column here, the annual payment on account of depreciation, is seen to be in each year the sum of the depreciation annuity and the sinking-fund interest for the corresponding year in the prior table. Capital basis of return is there full value; here it decreases each year by the amount paid on account of depreciation. The amounts in the dividend column are there \$6,000 each year; here that sum is less by the amount of sinking-fund interest in the former table; or otherwise stated, is 6% interest on the diminished capital value for the year in the present table. The total ratepayer's payments are the same by either table.

Let us see what ideas the present table can be considered to represent. The hypothesis is that the unit of capital is to be written off on the books each year by an amount equal to the sinking-fund annuity and interest. This is equivalent to saying that depreciation in value is progressive and follows a 6% sinking-fund curve. But obviously the capital must be maintained unimpaired; consequently the amount written off in capital value must be concurrently returned in the rates. And since the unit is [188] worth less, has in fact been partially paid for, the interest return is on the depreciated value, and is less each year. The table does not show the \$6,000 each year available for dividends; but since of the depreciation payment each year only \$7,587 need be held in capital account and placed at compound interest (not here shown), the balance will be available for dividends and will each year complete the \$6000 dividend requirement.

The equivalency in final result between these two methods suggests mere juggling of figures; and in fact one of the city's witnesses characterizes such processes as "arithmetical gymnastics," (8089), and says that the modified sinking-fund method is a "subterfuge" to apply the sinking-fund method, in effect, so as to meet the requirement of the Knoxville case that capital must be depreciated (8058). On the contrary, correct mathematical processes cannot in any degree be evasive; the only question is as to the truth of the hypotheses upon which they are framed. The modified sinking-fund method is one of two correct methods by which depreciation may be amortized throughout the life of the structure, when the value thereof is depreciated each year. It is the only method which shows present worth in any year after the first.

Certain characteristics of this table should be pointed out. Take the 6th year, where present or depreciated value, the rating base, is shown as \$47,080. If to that amount we add the annual allowances in amortization of depreciation for that year and each prior year, the result is \$100,000. This is the basis of the city's argument that there must be a harmonious relation between any figure adopted for depreciated value and for the [189] annual allowance in the rates. Obviously this must be true from the accounting point of view; that it may not be a necessary rule for our guidance in the practical instance of the appraisal of an old plant will, I think, appear. Take the 6th year again. If we are given a plant value of \$47,080, the sum of \$10,762 placed at compound interest at 6% will amortize or pay off that value in the four years of residual life. This fact will have an important practical operation.

The fourth method of accounting is called the straight-line method, in contrast with the two prior methods, which are curved-line methods, the reference being to the shape of the plotted results. A life is estimated for the structure, no account is taken of interest, and an equal amount of the capital value of the depreciating unit is paid back in the rates of each year. It follows that since capital is thus paid back, the investor's return must be calculated on the correspondingly lessened capital. The table will be as follows:

Straight Line Method.

Year	Rating base end of year	Annual payment account depreciation	Owner's interest return	Total ratepayer's payment
0.....	\$100,000			
		\$10,000	\$6,000	\$16,000
1.....	90,000			
		10,000	5,400	15,400
2.....	80,000			
		10,000	4,800	14,800
3.....	70,000			
		10,000	4,200	14,200
4.....	60,000			
		10,000	3,600	13,600
5.....	50,000			
		10,000	3,000	13,000
6.....	40,000			
		10,000	2,400	12,400
[190]				
7.....	30,000			
		10,000	1,800	11,800
8.....	20,000			
		10,000	1,200	11,200
9.....	10,000			
		10,000	600	10,600
10.....	0{ 100,000{			
Totals.....		\$100,000	\$33,000	\$133,000

The amount available for dividend purposes, which *ex hypothesi*, is \$6,000 per year or \$60,000 for the period is not shown, because the method neglects the operation of interest and on its face seems to show the yearly sums of \$10,000 maintained as idle money. In fact, they must be assumed to be earning interest, the total amount of which would be \$27,000, as a calculation will show.

This method, like the replacement method, is simple and easily applied, and compares favorably in this respect with the two compound interest methods. At the time it is well to bear in mind that any actual plant consists not of one but of thousands of structures, with differing lives; the selected method of amortization would have to be applied to each, so that even the straight-line method involves much computation. On the other hand, a defect

of the straight-line method of amortization is that it casts the heavier burden of payments upon the ratepayer of the early years when revenues are low, and, expressed in terms of value of service, when the load-factor of the unit is low.

[191] Now, I emphasize again the fact that we have been discussing accounting or book-keeping methods, adapted to satisfy by current money payments, the ratepayer's obligation to pay the owner interest on the capital employed and to provide the capital necessary to replace a structure which depreciates in service; in other words, these are mere matters of arithmetic. All will work out justly if followed from the beginning to the end of the life of the structure. On the other hand, the necessary amortization will not be accomplished if any selected method is pursued only for part of the estimated life; or when one method is followed for part of the life and another method for the residue. This is self-evident.

It is also important to emphasize the fact that except in the first and last years, these various figures illustrative of cost-accounting methods bear no necessary relation to annual depreciation in value of the structure *in fact*, or to the depreciated value of the structure, its value for sale purposes, in any given year. Both the modified sinking-fund method and the straight-line method are correct accounting methods, proper to be incorporated in advance, for example, in a contract between the state and a public service corporation. But where there is no contract, and the inquiry is, as in this case, directed to a determination of the *fact of present value in a given year*, both these methods cannot be equally right. In the example in the tables, for instance, the structure would be worth at the end of the sixth year, \$47,080 by the modified sinking-fund method, and \$40,000 by the straight-line method.

It has been necessary to discuss at length these accounting [192] methods, first as an introduction to a proper understanding of the problem in hand and secondly to show the palpable error of reckoning present worth and proper annual allowance purely on the basis of a cost-accounting method, without reference to actual condition and value in fact.

The problems involved in depreciation have only recently been studied and appreciated. The Spring Valley Water Company did not establish a depreciation reserve until 1908 (Exhibit 174); and this was the case generally throughout the country. (7963.) The

Knoxville decision in January, 1909, marked the time of change in accounting practice. Prior to that, all renewals and replacements were charged to operating account—the replacement method above; the public thus paid only for matured depreciation, and nothing on account of accruing but unmatured depreciation. In this state, the decisions of the Supreme Court refused sanction to an annual allowance for depreciation reserve in *San Diego Water Co. v. San Diego*, 1897, 118 Cal. 556, 583, and *Redlands Water Co. v. Redlands*, 1898, 121 Cal. 312. It is to be noted that the late Chief Justice Beatty, in a dissenting opinion, page 588, said that “an annual allowance should be made for a sinking fund” sufficient to effect replacement of depreciated plant.

It is evident, therefore, that we have before us in the case of the plaintiff, a situation where accounting practice has changed at a point part way through the life of the depreciating structures, from a replacement method, enjoined by the state court, to a method using depreciated value as the rating base, enjoined by the Supreme Court of the United States. It is thus a case where the neglect to provide in the rates charged for the [193] accruing depreciation cannot be said to be wholly the fault of the Spring Valley Company. In any event, under the rule of the highest court, the plaintiff has lost the unamortized depreciation in its existing structures; phrased otherwise, we must treat it as already paid, contrary to the fact. Now of the two methods of amortization where investment return is rated upon depreciated value, namely the modified sinking-fund method, and the straight-line method, the latter has been seen to involve, at any point in the plant's life, the greatest deduction for accrued depreciation of capital in structures. This is strikingly illustrated by Metcalf's testimony. At the master's request the witness computed accrued depreciation of the Spring Valley structures and the required annual allowance by both the modified sinking-fund and straight-line methods, reproduction cost and estimated lives being of course the same. The result was as follows (Exhibits 161, 162):

Modified Sinking Fund Method.

Cost new	Accrued %	Depreciation amount	Cost depreciated	Annual allowance
\$25,128,930	13.9	\$3,496,847	\$21,632,083	\$277,449

Straight Line Method.

\$25,128,930	31.2	\$7,835,847	\$17,293,847	\$403,891
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In other words, the plaintiff's capital must, on Metcalf's estimates, by a change from the replacement method of cost-accounting, suffer a deduction of at least three and one-half millions, which the public ought to have paid in the past but did not. Shall that loss be increased to nearly eight millions merely by a choice of theoretical mathematical methods of amortization? [194] As I said in the report in the Contra Costa case, if I were to decide the question of present depreciated value by reference merely to formulas of amortization, I should on grounds of obvious justice, adopt the method which involves the lesser deduction from capital made on the ground of an assumed but fictitious payment in the past. This case only strengthens the conviction I have previously arrived at, that the straight-line method is entirely unsuitable as a basis of valuation of properties of long life.

But the fact is that depreciation in *value* has no necessary relation of correspondence with any past plan of amortization—of payments of money in instalments—whatever. Depreciation of condition as a fact may not correspond with the depreciation reserve in money on the books, though the effort would be to that end. In the Contra Costa water case, the most credible evidence was that the depreciation in condition had in fact followed in the past life approximately the course of a 5% compound interest curve; and accordingly, present value was computed by an amortization method. But this only illustrates the rule that in any litigation of this class, we are interested, not primarily in amortization methods looking to past life, but in the *fact* of present value, whatever the past accounting history; and only as to present and future annual allowances are we interested in the accounting problem. A buyer's first question would be, what is the present condition of the plant, and what can I afford to pay for it? His second would be, what annual sums will amortize the remaining value in the remaining life? There is no fixed formula for determining what present condition, and consequent present value of a structure is. Different structures will be differently [195] treated in this respect. (7888.) The solution of the problem requires the highest exercise of sound judgment. Careful inspection must be made of each structure. The experience of other plants must be borne in mind. The experience of the particular plant must be studied to gain an idea of the rate of depreciation in the past; consideration must be given to influences that may change that rate for the future, and so determine the interval

that will intervene before replacement is necessary. Hazen's method of treatment will illustrate what I mean. The answer to the second question, that of annual allowances, may, I think, properly be treated as a problem in cost-accounting.

The city's witnesses, Dockweiler and Dillman, find depreciated worth and proper annual allowance by the straight-line method. Dockweiler finds, on an estimated reproduction cost of \$19-092,000 for all structures, an accrued depreciation in worth of \$5,039,000, or 26.4%. (The figures given are the first estimates, before reduction by agreements, elimination of paving, etc.) The percentage of depreciation seems excessive when compared with the experience of other plants of similar age. Metcalf speaks from a very extensive experience and study when he says (8007), "In general, for a property of this age," and he might have added, of similar excellence of construction, "the accrued depreciation upon the existing property is likely to lie between say 12% and 15%, slightly exceeding the latter amount perhaps in the case of properties containing many short-lived structures." It also strikes me forcibly that so heavy a depreciation as 26.4% is inconsistent with the witness's high commendation of the structural excellence and splendid present condition of the plant. The [196] Crystal Springs dam, and the Pilarcitos and San Andreas embankments he considers as good as new, and likely to last forever (8033); there is no siltage of the reservoirs that would involve functional depreciation of the dams. (7923.) The cast-iron pipes are in favorable soil, and are remarkably free from tuberculation (8037). The riveted wrought-iron pipes were laid and placed with care, and have been protected by a dip of unusual excellence. (8042.) The pumping plants are heavily built, have operated without breakdowns and deserve classification with plants of the best long-life limits. (8044.) In commending the plant in this way (and very properly, for all the witnesses are in agreement), the witness had in mind a justification of his estimates of future life, which are longer than those of Hazen and Metcalf, rather than of his estimates of present condition and value. It is to be remarked that if he had not adopted long lives, his accrued depreciation would have been still heavier, too great perhaps for the witness himself to justify. Inconsistencies are apparent. Where tunnels are depreciated, Dockweiler explains it by functional, and not physical depreciation. (8135.) But as to functional depreciation of the Sunol tunnels on the Alameda pipe-line, that would occur

by abandonment of the line and all tunnels would go out of use at once; and yet the witness, using the same life estimate, has given varying future lives to tunnels built at different dates. Functional depreciation, he says, is constant, and has to be figured on an accounting basis. (8151.) Physical depreciation is apparently progressive (8151); the result would be that the total depreciation would follow a curved rather than a straight line. But the witness refuses to make this conclusion [197] and concludes that lessening of worth is equal each year, though not visibly so, because the early years have to pass before the later years come into being, with the visible depreciation that accompanies them. Of course, this answer begs the question. In fine, Mr. Dockweiler has employed actual inspection methods in part, but only to determine future life; as to present condition as compared to condition new, and resulting present worth in money, he is enmeshed in a mechanical system of cost-accounting that defies reasonable justification.

Mr. Dillman also uses straight-line methods. With estimated reproduction cost new of \$18,461,000, he gets thus an estimated accrued depreciation of \$5,150,000, or 27.9%. He frankly acknowledges that his depreciation in value is attained by the mechanics of his accounting method, by elapsed life rather than by inspection of present condition. (8077, 8155.) He adopts the straight-line method because it is simpler in computation; he says, "the general principle, 'whatever simplifies serves and whatever complicates is bad' warrants its adoption." (8057.) For accounting purposes this may be true, but it obviously results most unjustly in determining the present value of a waterworks midway of its life, whether for rate-fixing or condemnation. The testimony shows that the witness has not given much heed to the current thought on depreciation, and does not fully understand the various methods. For example, when he says (8090), "The annual allowance, to be right, should be such as that it in amount with interest at fair rates shall exactly reproduce the part in question at the end of life," he is stating the sinking-fund theory of amortization. The straight-line theory takes no account of interest.

[198] The city's estimates of accrued depreciation and present worth are therefore fundamentally erroneous and need detain us no longer. I shall give no consideration to their figures for annual allowance, since these, by their method, are larger than those of the

plaintiff's witnesses; and to adopt them would be unjust to the city.

Our determination must therefore be made on the basis of the estimates of Hazen and Metcalf. It will not be possible to describe their methods in adequate detail.

Hazen determined the depreciated condition of the various units at the same time as he did the reproduction cost (7886-7), accumulating the data for both by an actual inspection in the field performed with great thoroughness. He made careful study of the past history of the plant in the matter of depreciation and abandonments. His figure for accrued depreciation is intended to include functional as well as physical depreciation (7888), though we have the authority of Metcalf for saying that Hazen does not charge off functional depreciation until it is fairly in view (11194). His percentages of condition as compared with a new unit are given in his schedule, Exhibit 97. Where our experience with this or other works enables us to form reliable judgments as to the total life-expectancy of particular classes of structures, such as flumes, pumps or boilers, he uses a 5% sinking-fund curve as a measure of present condition, applied to the life in question. In particular cases, as of hard service or poor design of pumps, he sometimes estimates percentage condition at once by an effort of judgment. This would correspond to a variation in life-estimate, which I think he must always have had [199] in mind in his calculations. Hazen's treatment of cast-iron pipes is interesting. Here experience gives us no sure guide to length of life. He notes as the factors of depreciation, breakage, leaks, and decreased carrying capacity (7897). The first, breakage, is practically negligible in the Spring Valley experience; small breaks will be carried in operating repairs account. Leakage is often important in reducing the value of pipes, and would be especially important here because the water is much more valuable than in the East (7898). By careful laying and maintenance, and also by going over the city system after the earthquake of 1906, the pipes, Hazen says, "are unusually tight and free from leakage, * * * practically water tight" (7898). These two factors being eliminated, Hazen's judgment as to present condition and value was formed partly by consideration of the decrease in carrying capacity, and partly by judgment as to the problem of functional depreciation, the latter applying chiefly to pipes of smaller diameters. His appraisal with reference to carrying capacity was on the theory that a partly corroded or tuberculated pipe was

worth the cost of a new pipe of equivalent capacity; and this loss in capacity, proceeding in a fixed relation to age of pipe, was determined by reference to formulae in the Williams and Hazen hydraulic tables. The results of local tests of the Spring Valley pipes by pitometer were noted. This brief survey will illustrate the practical nature of Hazen's methods of determining present percentage condition. A number of structures, *e. g.*, the principal dams, are not depreciated at all.

Metcalf's estimate of accrued depreciation follows much more closely the sinking-fund method on a 4% curve of depreciation. [200] He likewise made close investigation, by inspection in the field, of present condition of structures. While Hazen's mental attitude is to estimate percentage condition first, and deduce remaining lives from that, Metcalf finds it easier and deems it safer to work from a life estimate primarily, adopted from his experience, and check the resulting percentage condition, as to its reasonableness, by inspection and consideration of all surrounding conditions (8126, 8116). His testimony contains a valuable description of methods of estimating depreciation. He points out (7968, 7969, 8005, 8066), as does Hazen (7891), that the actual course of depreciation follows a sinking fund curve and not a straight line. Metcalf gives some depreciation, though small, even to such permanent structures as the dams. In other cases he estimates on practical grounds without reference to theoretical bases.

On Hazen's total gross reproduction cost of \$25,125,843 the estimate of accrued depreciation is \$3,192,455, or 12.7% (Exhibit 97). On Metcalf's gross reproduction cost of \$25,128,930, the estimate of depreciation is \$3,496,847, or 13.9%. These were their first figures. Revised so as to be applicable to the master's figures for gross reproduction cost, *i. e.*, deducting the Pleasanton drainage ditches, Niles aqueduct, Ravenswood wells, Merced concrete dam, and paving over pipe in the city and outside, Hazen's gross reproduction cost becomes \$23,670,842, and accrued depreciation \$2,863,599, or 12.1%; Metcalf's gross reproduction cost \$23,674,542, and depreciation \$3,318,680, or 13.6%. To make their figures and the master's exactly parallel, the Calaveras dam and the inventory should also be deducted; on this basis, Hazen's percentage of depreciation remains 12.1% and Metcalf's [201] becomes 13.7%. These percentages are based on the totals of all the structures, those subject to depreciation and those not so subject. I agree with Hazen in his enumeration of structures that do not depreciate. Expressed as a percent-

age of the reproduction cost of structures subject to depreciation, according to Hazen, and omitting the Calaveras dam and the inventory, Hazen's accrued depreciation is \$2,752,189 or 15.2% and Metcalf's is \$2,942,858 or 16.3%.

I have to choose, then, between a percentage of depreciation of 12.1% and one of 13.7%. At best the determination is an estimate and my judgment inclines toward an agreement with Hazen. A figure of 13% seems to me fair. This gives a deduction from gross reproduction cost new, \$21,537,000, of \$2,800,000. Expressed as a percentage of structures subject to depreciation, rather than of all the structures, this sum of \$2,800,000 would be a larger percentage, perhaps 16%, but I have not thought it important to make the computation.

I find that the present value of the structures heretofore listed was on December 31, 1913, \$18,737,000.

Our next task is to determine the annual allowance which should be accounted in the year 1913-14 toward the amortization of depreciation. My understanding of the problem is that it seeks to determine the sum which with compound interest at a given rate will amortize the residual value, already determined, in the residual life. This involves the determination of an interest rate, which presents no grave difficulty, and of future life estimates, which presents serious ones. In previous cases, the uniform practice of engineer witnesses has been to assign periods [202] of expectant lives to the various structures, without a disclosure of radical differences, and I thus gained the impression that engineering knowledge was reasonably exact in this regard. The testimony here seriously disturbs that impression. Hazen has so little faith in estimates of future life that he discards them entirely in determining his annual allowance to depreciation reserve. Metcalf says the present system of water supply in this country, with running water throughout every dwelling, dates from the seventies (8010), though this plant is older, as we have seen. The doubt as to life-period seems to me to affect chiefly the larger pipes, of course a very substantial item here. All witnesses but Hazen use estimates of remaining life in fixing their allowances.

The various estimates of proper annual allowance to provide for depreciation are:

Hazen, 1st estimate	\$219,000
final estimate	284,000
Metcalf	260,000 (Exhibit 160)

Dockweiler	269,000	(page 8032)
Dillman, 1st estimate	252,000	(page 8085)
final estimate	228,000	(Exhibit 213)

Hazen's method involves first the determination of the total depreciation that has taken place in the history of the plant, that is, the sum of the costs of discarded structures and estimated depreciation as already determined in existing structures. He then determines the average age of existing structures. From this he determines the mean annual rate of depreciation reckoned on depreciated capital of each year. For the Spring Valley [203] structures he thus obtains 0.99%, which he rounds out to 1%, or \$219,333, based on his depreciated reproduction cost. A second method involves determining the total gross income of the company from sales of water from the beginning and then determining the percentage relation which the total depreciation since the beginning bears to this base. This he finds to be 8.45%. Applying this percentage to the gross income for 1913, he obtains a figure of \$284,000 as the annual allowance for depreciation for that year. This figure he finally adopts. His various computations may be seen in the record.

Hazen's preference for the facts of history rather than for an estimate based on estimated future life, is characteristic. He also seeks corroboration in the history of other works, and presents like data regarding works at three other cities, viz., four combined plants supplying Portland, Maine, and the plants at Racine, Wisconsin, and at Denver. Metcalf adds Wilkinsburg, Pennsylvania. The results, first as a percentage of depreciated capital and second as a percentage of gross income, are: Portland, 1.46% and 9.57%; Racine, 0.47% and 6.70%; Denver, 1.31% and 12.40%. The average percentages, including Spring Valley, are 1.06% and 9.28%. The striking thing about the percentages at the different cities is their diversity; and it seems plain to me that no average can be of value unless based upon a much greater number of instances than four. Hazen does not seem to have given any effect to the plant histories elsewhere, since he does not modify his calculated percentages for the Spring Valley Company. The data is of positive value in showing, *pro tanto*, the unreliability of the results upon the straight-line method.

[204] It is difficult for me to see any good reason for Hazen's change from his estimate of \$219,000 to one of \$284,000. Both are admittedly rule-of-thumb methods, of course; but both cannot be

right, and a court must necessarily have a very good reason for casting upon the ratepayers an additional burden of \$65,000 on account of depreciation. Depreciation is in no sense a function of gross revenue, and I see no reason for determining percentage of annual depreciation upon revenue, beyond the fact that it is a known amount. As well might we measure it by the population of San Francisco, or for that matter of New York. I am inclined to believe that Hazen preferred the larger amount for the reason that in anticipation of the large capital additions that will come into the rating base with the completion of the Calaveras supply, it would be the part of wisdom to lead up to the inevitable increase in depreciation allowance by gradual steps. The first method seems preferable, since depreciation is more likely to bear a relation to plant value than to revenue. Hazen says that he has no fixed preference between his two methods and would be disposed to take a mean between the two figures (8315).

Despite the authority that Hazen's testimony carries against its adoption, I am disposed to agree with Metcalf that it is preferable to figure the annual allowance upon a modified sinking-fund basis, using an estimate of residual lives. It may be granted, as Hazen says, that such future estimates are uncertain, but Hazen himself must have an estimated life to some [205] extent in mind when he determines percentage condition. At least it can be said that among the four estimates of uncertainty contained in this record, we can select something like a fair mean, to represent remaining lives of the units. It must be borne in mind that our whole calculation is not precise. The end of the annual depreciation allowance is to amortize the present depreciated value of the plant, based upon reproduction cost estimates. Obviously the future *replacement* cost, which the public is obligated to make good (less present depreciation) may be more or less than present estimates. We assume that that will be taken care of by the company or the regulating authority. If our life estimates or our interest rate prove excessive or inadequate, that likewise can be adjusted. All we can hope to do is, for the years in question, to adopt allowances that seem fairly and reasonably fitted for the end in view, so far as our present knowledge permits us to judge the truth.

Our problem then is: given an aggregate of structural units whose total value in 1913-14 has been determined to be \$18,737,000, to find the annual sums to be allowed in the revenue each year such that, under the modified sinking-fund method, they will amor-

tize or pay off this value in the lives which remain before replacements are severally necessary for the various units making up the aggregate. Specifically, the problem is to determine this annual allowance for 1913-14. This involves a complicated computation. It is necessarily performed for each unit, or group of units having the same residual life. My valuation has proceeded hitherto by groups of structures of the same kind, though of varying future lives; and accordingly it has been a necessary preliminary to calculate from the totals to the value of the individual structures. The next premises to be adopted were the remaining [206] lives or periods of amortization, and the rate of interest that will be earned on future payments. As to remaining lives, it has seemed to me fair to both parties to adopt Metcalf's estimates, with the exception that I have followed Hazen in assigning unlimited or perpetual life to certain structures, comprising about \$4,566,000 of my total value. As a rate of interest I have adopted 5%. Assuming that the payments on account of accruing depreciation will be invested in the plant, rather than in prime securities, they would theoretically earn the rate adopted as return on the capital in use, possibly 6% or 7%; but experience shows that construction requirements do not proceed uniformly, so that the fund will at times be idle, or if invested, be used in the purchase of securities at a lower rate. No one can forecast interest rates for 20 or 30 years with precision; but precision is not necessary, since the rate and the amortization increment can be adjusted from time to time. For the period in question and for a reasonable period of future time, 5% seems to me fair for this purpose.

It has seemed best at this point to call in the parties' engineers to make the computations on the premises thus determined by me. N. Randall Ellis, for the city, and John J. Sharon, for the company, have performed the very intricate computations necessary. They agree that the resulting annual allowance for 1913-14, on my assumptions, should be \$218,000 and I adopt this figure as correct. The task is, however, at this point only one-eighth completed, since there are eight cases and eight fiscal years concerned. Metcalf's Exhibit 202, pages 4, 5, shows the method by which the net or depreciated value of the structures is determined for each year in question, going forward and backward from 1913-14, giving [207] effect to the net annual betterments after deducting depreciation for the year, and the annual allowance for depreciation. Expenditures on the Calaveras dam during the period have

been deducted, as they are elsewhere accounted in this report. I do not reproduce the computation in full, but it is open to the examination of the parties. It shows the following results, which I adopt:

	Net or depreciated reproduction cost	Net annual betterments	Annual allowance for depreciation
1907-08.....	\$19,186,000		
		\$151,274	\$156,000
1908-09.....	19,169,000		
		91,003	168,000
1909-10.....	19,084,000		
		94,996	176,000
1910-11.....	18,994,000		
		87,759	185,000
1911-12.....	18,887,000		
		170,937	195,000
1912-13.....	18,851,000		
		104,088	207,000
1913-14.....	18,737,000		
		39,971	218,000
1914-15.....	18,559,000		
			232,000

CALAVERAS DAM

This item in the inventory covers the dam at Calaveras which is still in course of construction. The inventory presents the agreed figures of actual expenditures, interest and the total at \$546,869. The expenditures other than interest are thus segregated: (1) preliminary investigation, exploration and report under direction of Hermann Schussler, in the years 1887 and 1902-6, \$56,574.87; (2) preliminary investigation, exploration and report under direction of John R. Freeman, Samuel Storrow, William Mulholland and F. C. Herrmann, beginning 1910, and construction [208] work up to Dec. 31, 1913, under direction of William Mulholland and F. C. Herrmann, \$430,498.94, and (3) interest, to June 30, 1913, the grand total being stated at \$546,869. Both Hazen and Dockweiler add a sum for interest to December 31, 1913. But the inventory, in giving the figures for interest for the first half of that year only, says "the interest for the period July 1st to December 1st, 1913, having been included in the construction account." If it has been thus accounted, I see no reason for the addition. In Exhibit 97, his final summary, Hazen makes no addition for administration; in his detail, Exhibit 96, he adds 5%

for that purpose. Something can be said for this in estimating the value of the work done. On the other hand, the construction seems to have progressed rather more slowly than would be normal, thus increasing interest. I think this addition may properly be omitted at this time.

There is no issue as to the fact that these sums were actually expended to provide an addition to the water supply of San Francisco; and likewise no issue that the expenditures and the additional supply were needed to provide a reserve over actual demonstrated requirements of the years in question. It is also admitted that the dam did not add any water to the supply in these years. It is on the latter ground that the city contends that this item of property should be excluded from the base upon which a return should be made in the rates for water-service. Such property, the defendant believes, is not "used and useful," to use the phrase of the usual formula.

Citation is made in support of this position of *San Diego* [209] *Land and Town Co. v. National City*, 174 U. S. 739; *Spring Valley Waterworks v. San Francisco*, 165 Fed. 667, 697; 192 Fed. 137, 145, 155, 170; *Southern Pacific Co. v. Bartine*, 170 Fed. 725, 767. In the *National City* case, the court said, "What the company is entitled to demand, in order that it may have just compensation, is a fair return upon the reasonable value of the property at the time it is being used for the public." But the court's language was there used in reference to a claim that original costs should be the measure of return. Reference may be made to the *Jasper* case, 189 U. S. 439, where at page 447, the court referred to a plant built to irrigate 6000 acres seeking return from 500 acres actually supplied, and said that, if necessary to validate the state's legislation, the court would assume that only a proportional part of the system was actually used and useful. The *Bartine* case at the point referred to, was like the *Jasper* case; there was a pioneer railroad serving an unsettled district in Nevada which could not then support it. These are cases of overbuilt or abnormal plants, where, as we have seen, return on full value cannot justly be expected. They are not pertinent to the present facts. In the two *Spring Valley* cases, Judge Farrington used language which, in isolation, supports the city's contention. I quote pertinent sentences from the case in 165 Fed., at page 697: "It is not just to compel consumers to pay for more than they receive, or to pay complainant an income on property which is not actually be-

ing used in gathering and furnishing water. * * * When the property does come into necessary service, the company is entitled to have it credited at its then fair and reasonable value for rate-fixing purposes." This language, however, [210] was used generally with reference to lands held for *future* use; there is now a good deal of such land upon which return is not claimed. So in the 1903 case, in 192 Fed., Judge Farrington said (145):

"The value to be ascertained is the value at the time of the inquiry. Only that property is to be considered which was then used and useful in supplying San Francisco with water. * * * (155.) San Francisco should pay what is reasonable for the service rendered. It should pay for what it receives; it should pay for no more, and no less. It is unreasonable to require payment for a service which is neither rendered nor received. It is equally unreasonable that the company should expect payment for water which it does not deliver, or for property which was neither used nor useful in producing, gathering, storing, protecting, or distributing the water which was delivered to the people of San Francisco between June 30, 1903, and July 1, 1906, the period to which our inquiry relates. As to this there is and can be no dispute. The average daily consumption is about 33,500,000 gallons; the daily capacity of complainant's plant is 35,000,000 gallons; but it is alleged that with additional dams and aqueducts complainant's plant will be capable of supplying San Francisco with more than 110,000,000 gallons per day. In other words, the plant is sufficient, with reasonable development, to supply the needs of San Francisco when it has a population of 2,000,000. The company has looked ahead for 50 years; it has invested wisely and judiciously; it has a great property; but it does not necessarily follow that the water rates in question are confiscatory because they fail to yield an income of 7, or 6, or even 5% on the full value of this property."

It is apparent that in this passage, which the city quotes [211] in its argument, the reference is made to the full property, including property which could not possibly be claimed to be in use. The court then continues and makes specific reference to the Calaveras and neighboring lands, for which reservoir values were claimed. As to these the court considered that while in a condemnation case, the full market value including the value for

reservoir uses, would necessarily be awarded (pp. 156-7); in a rate-fixing case, at a time when their only use was as watersheds for collecting and protecting the water, they should be allowed income only on this less valuable use. (159-60). In this connection, the learned judge said, and the city's omission of this passage from its quotation is significant:

“While the company should be in advance of the present demand, and provide for emergencies, for growing population, for unusual droughts, and for extraordinary conflagrations, it should not be too far in advance. If property is to be included in a valuation for rate-fixing purposes, it must be shown to be *either presently useful, or to be necessary for wants that are near at hand.*” (p. 159, emphasis mine.)

On the next page, he says:

“When in the future reservoirs are *constructed and in use*, the lands will be valued for rate-fixing purposes at their full value, the value at which they could be acquired at that time in condemnation suits.”

The latter quotation, which apparently conforms to the city's position, must, I think, be read with the former, which admirably states the basic principle. Property in reserve is useful and entitled to valuation for return in revenue when it is necessary for wants near at hand.

We could then consider this item of dam construction in the class of reserve property necessary for wants near at hand. But [212] the case is stronger than that—the active period has, in any common sense view, begun when construction starts. To postpone the date when the dam is deemed a useful part of the works, until water begins to flow from its storage, is not only to deny any application of the immediate reserve principle, but to assume, in order to satisfy a formula, that a dam can be created over-night and neglect the investment made by the company during the necessary years of construction. The city's contention would also require a considerable addition to be made later to the rating basis in the nature of development expense deficits.

I conclude, therefore, that while Judge Farrington was right in omitting the exploration work at Calaveras from the capital in use in 1903, both common sense and authority requires the inclusion of these expenditures in the years here in question beginning in 1910, when work began to be prosecuted quite actively.

The following additional authorities may be cited in support of this position:

Long Branch Commission v. Tintern Manor Water Co., 72 N. J. Eq. 71 (1905);
 Whitten, Valuation of Public Utilities, sec. 216;
Consolidated Gas Co. v. New York, 157 Fed. 857 (1907);
Ely v. Ely Light & P. Co., 3 Nev. P. S. C. 315 (1913);
Re Lincoln Tel. & Tel. Co., 6 Neb. R. R. Com. 199 (1913);
Phoenix v. Pac. Gas & El. Co., 1 Ariz. Corp. Com. 369 (1913);
Re Montreal, 13 A. T. & T. Co., Com. L. 93 (1913);
Public Serv. Com. v. Seattle L. Co., P. U. R. 1915 B, 138;
Buffalo Gas Co. v. Buffalo, 3 P. S. C. 2d N. Y. 553 (1913).

[213] I cite these decisions of state commissions from plaintiff's brief, where they are quoted.

In computing results, I have calculated simple interest to 1910 on earlier expenditures, and thereafter compounded each year. I have averaged calendar years to obtain expenditures for fiscal years, and in 1914-15 I have added expenditures shown in Exhibit 202 of \$126,871.83. The following sums will be added to the valuation in the years named:

1910-11	.....\$113,854.15
1911-12	..... 154,032.28
1912-13	..... 197,097.32
1913-14	..... 514,304.32
1914-15	..... 672,034.41

This result is not consistent with my treatment of the Calaveras reservoir lands (*supra*, pp. 82, *seq.*). Those lands were appraised not at their full market value, considering their availability for reservoirs, but as farm lands only. This case has been considered in subdivisions throughout a period of over six months, and the report written as the parts were decided. The principle applied to the dam was appreciated then, as the language shows, but for reasons then appearing to me sufficient, and not now clearly in mind, the additional value of something over \$200,000 was not considered. After all, it is the final result that is important, and I do not now deem it necessary to go through the necessary recomputations and rewrite that portion of the report.

[214] INVENTORY—WORKING CAPITAL

I treat these items together. They are often so considered, the inventory, or stock on hand, being the spare pipe and other

materials, tools, etc., obviously necessary in any waterworks, and the working capital being the spare money capital, other than that fixed in permanent form, necessary to meet the interval between current receipts and current expenditures. Both sides, happily, are agreed in the principle that dictates these additions to capital, and also in the amounts that should be allowed.

The witnesses have considered the inventory along with the structures and have included the figures agreed upon in connection with the depreciation estimates. The agreed figures are: Reproduction cost new, \$401,350; present value (less depreciation), \$289,940. Ordinarily it seems to me the inventory should not be deemed subject to depreciation. I understand it was here depreciated to make adjustment of book values, with which we are not concerned. I have accordingly deferred consideration of this item, and pick it up now at the agreed allowance for present value.

The allowance for cash working capital is agreed at \$100,000 for all the years here concerned; that is, Metcalf uses this figure (10177), and Dillman, for the city, a sum of \$400,000 for inventory and cash capital, or about \$110,000 for the latter item alone.

I shall add \$390,000 for inventory and working capital, without change during 1907-15.

We have now finished an appraisal of the plaintiff's property claimed to be in use, the lands and rights by the standard of market value, the structures, by that of reproduction cost, [215] less accrued depreciation. There is yet to be considered the added value of the whole, if any, by reason of the fact that it is a going concern, and the final fair value to be adopted for rate-fixing purposes, considered from these and other points of view.

Before doing that, and in part in preparation for the consideration of the proper rating base, it will be in order to consider the properties or values which should be excluded.

EXCLUSIONS FROM CAPITAL

The ordinary formula for exclusions of public service property from the capital upon which return is to be allowed is that only that property is included which is presently "used and useful", including therein reserves for needs reasonably near at hand. Perhaps a more inclusive principle would be founded on the concept of

Normal Plant, previously referred to. Unused or useless property could not be considered part of a normal plant. But, furthermore, sometimes part of the *value* of property actually used and useful will be excluded, as *e. g.*, where the plant is overbuilt, and so abnormal; where the value in use is extravagant in the sense that less expensive means can be employed to perform equivalent service, as illustrated by Hazen's treatment of the Merced watershed, soon to be discussed; or where land whose highest value is for reservoirs is used for the less valuable service of watershed protection, as illustrated by Judge Farrington's treatment of the Alameda reservoir sites. (192 Fed. 160.) It is by such applications that we give effect to the principle that "the rate must be reasonable to the consumer".

All necessary exclusions from structures and water rights [216] have been disposed of, unless overlooked by inadvertence. Our examination then will be directed to the property in land.

In the year 1913 plaintiff owned about 100,000 acres of land, of which, according to its contentions, about 73,000 acres were used and useful, and so entitled to a return in the rates as capital in the public service. The city contends earnestly that about 42,000 acres in addition should be excluded from capital in use. The value of the amount of land thus in issue may, for illustration, safely be approximated, without attempting an exact calculation, at something over \$6,000,000.

This position on the part of the city represents, as to much of the land involved, a changed point of view. It had been, for an indefinite time in the past, the practice of the Board of Supervisors, in fulfillment of its constitutional duty, to fix water rates early in each year; to require from this water company and its grantor a statement in detail of its property in use; and from the city engineer a like statement, together with an appraisal. Up to the end of 1913, at least, there seems to have arisen no issue between these two sources as to the usefulness of the property here involved. Prior to 1913, and apparently as early as 1901, the reports of the city engineer and of the rate-fixing committee of the supervisors had treated all this property as in use in making up a valuation. (10822.) (The city objected to this evidence, and a ruling was reserved for the argument, but apparently not brought to my attention. It is now overruled; the use I make of it will appear.) It is not clear whether the Nusbaumer tract, the Pleasanton ranch lands, or the lands in the Arroyo Valle

were considered by the city as in use, and I will [217] assume to the contrary; but apparently the Merced, Calaveras, San Antonio, Upper Alameda and Sunol lands were all deemed in use.

In the opinion in the 1903 case, delivered in 1911, Judge Farrington included all these lands last mentioned, excluding the Arroyo Valle lands. I mention this in introduction to Mr. O'Shaughnessy's 1913 report on value for rating purposes.

Mr. O'Shaughnessy became city engineer in September, 1912, and has held that office to this date, under the Board of Public Works of the city of San Francisco. In January, 1913 (10680), the said board was directed by resolution of the supervisors to submit an appraisalment of the properties of the plaintiff, "actually used" in furnishing the city and its inhabitants with a pure and wholesome water, so that the supervisors might establish a valuation upon which it might fix water rates for the ensuing fiscal year. (10720.) On February 24, 1913, a resolution of the supervisors was passed, and was received by Mr. O'Shaughnessy about March 1, 1913 (10709), directing the city engineer "to prepare a list of properties belonging to the Spring Valley Water Company * * * which said lands, properties, etc., are actually necessary, available, and usable for a source of water supply for the City and County of San Francisco, and which lands and other properties, including distributing sytem, can be made an intergral part of a Sierra water supply"; and "to include in this list only those properties which are economically and scientifically available for the use of said City and County of San Francisco in its acquisition of a municipal water supply, and exclude therefrom all properties, water rights, etc., which are not economically valuable or usable as adjuncts to a Sierra supply". (10686.)

[218] Both these resolutions, with the distinction therein embodied between properties useful in the present supply and properties necessary, "economically and scientifically", in connection with the city's projected supply from the Hetch-Hetchy Valley, were therefore before the city engineer when he reported in response to the former on April 19, 1913. This report was to the Board of Public Works, and was by that board approved by resolution, and, as an appraisalment "of the properties of the Spring Valley Water Company actually used", etc., was transmitted to the Board of Supervisors by letter dated April 21, 1913. (10719.) In the report Mr. O'Shaughnessy states that he bases it upon Judge Farrington's decision in the 1903 case, and for changes in

the property list, upon the company's reports to the supervisors and reports of preceding city engineers. In fact, it appears to have been a verbatim copy of the 1912 report of City Engineer Manson (10822). Deduction was made of property which had gone out of use since 1903, and addition of properties since acquired, including watersheds at Merced and elsewhere, water rights, rights of way, reservoir areas, etc. (10722.) A list was appended of properties acquired since Judge Farrington's decision but not at present in use. (10723.) There was thus an examination and discrimination as to properties useful and not useful, both before and after 1903, and, as stated, the Calaveras and Merced lands were classed as useful. There was also present in the mind of the city's engineer a possibility of differing value in case of an acquisition by the city. He says (10723):

"Attention is directed to the fact that this appraisal contains no allowance for appreciation in value of properties appraised by Judge Farrington, no allowance for the value of reservoir properties in the Alameda Creek system, which [219] the Spring Valley Water Company claims are at the present time being used as reservoirs, nor any allowance over their original cost for properties purchased since 1903-4. The valuation given in this appraisal, therefore, is to be considered as the value for rate fixing purposes only and should not be confused with the amount which it would be reasonable for the City to pay in the event of its desiring to purchase the properties of the Spring Valley Water Company in their entirety."

In November, 1913, the city engineer reported to the Board of Supervisors as to properties needed in connection with the Hetch-Hetchy supply, in response to the resolution of the prior February. The report is in the record. (10711.) As to the Merced lands, Mr. O'Shaughnessy said:

"The most complex problem in connection with this work was the segregation of necessary lands around Laguna de la Merced so as to conserve this body of water from contamination by future settlement and development."

To accomplish this he proposes to segregate from the 2835.76 acres of the rancho two small pieces aggregating about 121½ acres, and a tract of 811 acres including and surrounding the lake area of 336 acres (see map, Exhibit 217), all to be surrounded by an 80-foot boulevard. He recommends also that, by agreement or by the

decree in condemnation, the building of houses be forbidden within 150 feet of the center line of the boulevard, on the portion of omitted lands lying westerly from the south lake. By these means he thought undesirable drainage would be arrested, a large area opened for settlement, and park grounds made possible within the area to be acquired.

[220] On December 31, 1913, the city filed a complaint in condemnation, verified by the Mayor. (Exhibit 230.) It recited a prior ordinance of the Board of Supervisors, approved by the Mayor, stating the necessity of the acquisition of the properties of the water company. The seventh paragraph states that ever since their acquisition the lands sought to be condemned "have been and now are used exclusively for the furnishing of a water supply to said City and County of San Francisco and its inhabitants". Except for the segregation noted at Merced, the complaint, on a cursory inspection, seems to cover all the lands claimed by plaintiff to be in use, including some small areas conceded not to be in use. This action is still pending, nothing apparently having been done to forward its progress beyond the filing of the complaint and the service of summons.

It is not contended by the plaintiff, and I do not assume, that the city is now, by these reports of its responsible officers, estopped to deny the usefulness of the properties in question. I do not give them any controlling weight. The questions before us are: Were these lands in fact used to protect the water supply, and if so, were they reasonably so used, from consideration of their actual usefulness, and of their value? I do not approve what seems to me the necessary implications of the city's position, viz., that, granted that property is in fact dedicated to public service and in use, the company must exercise its judgment as to the *utility* of that dedication at its peril. That seems too harsh a rule, and disadvantageous to the public interest in the long run. If there is apparent a reasonable judgment that certain land is useful to protect the supply, and accordingly the land is dedicated [221] and so used, common justice seems to require that the company shall be compensated, even though it may later seem possible, or even be demonstrated, that the judgment was a mistaken one. In this view the reports of the city's engineers seem worthy of consideration here; and as regards the reports of the present engineer, they may also be weighed along with his conflicting testimony on the witness stand.

San Francisco Lands Other Than Merced

As to these lands it is agreed that Exhibit 166 correctly states the amount of property not in use at \$151,394, thus reducing the agreed valuation, \$1,166,685 (*supra*, p. 30) to \$1,015,290. (Arg. 53.)

Lake Merced Lands

The question here is as to the exclusion from the useful property list of all the watershed outside the portion included in the condemnation area of 811 acres and the two smaller parcels of about 12 acres. The court will be assisted in understanding the problem by the maps, Exhibits 217, 165, 206 and 45.

The problem is, as Mr. O'Shaughnessy says, a most complex one. The particular factors which differentiate the problem here from that at any other watershed are (1) the sandy character of the soil, and (2) the high value of the land.

It is conceded by the plaintiff that tracts 20, 23 and 25 of Exhibit 45 should be excluded; these drain to the ocean. The company maintains a drainage tunnel under tract 23, the value of which has been neglected in the concession referred to. Certain lands north of Sloat boulevard have been excluded, and were not valued in the early portion of this report.

The general physical characteristics and the situation of [222] this land in relation to populated areas of San Francisco have been referred to early in this report.

The Merced rancho owned by plaintiff constitutes, roughly, half the area within the watershed of these lakes. (Exhibit 206.) The natural surface run-off through the gullies is all diverted from the lakes by dams, flumes and intercepting brick canals leading off the watershed. At the northeast portion, the sewer from the Ingleside district is carried across a corner of the tract in a cast-iron pipe with lead joints. In 1907-08, the company built a sewer from the town of Vista Grande, running outside its other protecting works, to the tunnel leading to the ocean. The various protective constructions can be seen depicted on the map, Exhibit 217.

The soil surrounding the lakes is sandy in character, except in such places as the bluffs overlooking the ocean or the low bluff east of the south lake, where it is cemented into an incipient sandstone. The sand is mixed with alluvium in varying degrees, less so nearer the ocean, and more so easterly of the lakes, and

generally far more alluvial than the dunes northerly to the Golden Gate. The surface run-off referred to above in connection with diverting structures must originate chiefly outside the company's property; for in the sandy soil of the rancho there is a complete infiltration, without run-off, even in the hardest storms. (Eastman, 10,967.)

The lakes are supplied by springs beneath the water-surface. The average daily supply from this source is $3\frac{1}{2}$ million gallons; the storage capacity is 2,659 million gallons. (Exhibit 12 hh). It is important to remember that from a very early date down to the [223] present time the supply from this source has been used, and it is now an especially necessary part of the city's supply, by reason of increased consumption; and this situation will continue until the Calaveras new supplies are brought into service. After that, the Merced lakes will pass into the reserve class, as an emergency storage, useful and very valuable in that use, in the event the other sources are cut off by war or by disaster to the supply mains on the peninsula. These lakes were temporarily the sole supply of San Francisco, after the main aqueducts were broken in the great earthquake of 1906.

With these diversion works and especially with this great natural filter of sand around the lakes, it might be expected by the layman that the water would be of excellent quality. Such is not the case. It is a safe water, "a fairly good potable water, but not so good as the water from the other sources of this company." (11092.) The difference, I understand, is in the way of greater organic content. The city engineer ascribes this condition to the cultivation and fertilization that has more recently taken place. Perhaps the facts in this regard should here be stated.

Until the end of 1909 there was neither habitation nor cultivation upon any of the Merced lands. In 1909-10, an examination of this and other sources of supply was made under the direction of Dr. Rupert Blue, a government officer then in charge of matters of public health in this vicinity. He advised that by reason of the capacity of the Merced watershed for filtration there was no objection to cultivation or fertilization of these lands, but that it should be kept away from the ravines leading [224] to the south lake, and if tenants were permitted to live on the land, concrete basins for the catchment of sewage should be provided. This advice was followed. (10939-41.) The exact order in which the lands were leased is not entirely clear. Apparently just before

Dr. Blue's report, acting on the advice of its engineers, during the winter of 1909-10, the company made leases in the extreme southerly and extreme northerly ends of the property, but tenants were not then permitted to live on the property. (10938-9.) It is also in evidence that of the 811 acres in the condemnation area, the following tracts were under lease during the years 1907-15: (1) on the watershed of the north lake, tracts of 2.6 acres, 2.8 acres, and 1.1 acres, apparently parts of a larger area extending beyond the condemnation line, leased for vegetables November 1, 1909; an area of 8 acres for vegetables, March 1, 1910; part of an area of 118 acres leased for potatoes March 1, 1910, to November 1, 1910, but not fertilized, the balance of this area not being leased until December 1, 1913; (2) in the watershed of the south lake, an area of 3.8 acres back of the sandstone bluff, leased for vegetables March 1, 1910; an area of 3.6 acres southwest of the lake and of the diverting canal, leased for vegetables since November 1, 1910; and an area of one-half acre, east of the lake behind the interception flume, in vegetables since February 1, 1911. (Exhibit 217, 10960 *seq.*) I infer that these small areas described are portions of larger areas extending over the rancho, except for a portion on the east line leased to a golf club. Drainage from the southerly end goes to the waste pond which connects with the brick-lined canal. (10963.) Just when manuring of these areas began is not clear. It was very apparent when I made [225] an inspection trip in the fall of 1915, and I will infer that it began with the leases, except where otherwise noted. Other facts which will be pertinent will be stated later. It will be most convenient to consider the views of the witnesses at this point.

Hazen has had wide experience in sanitation; in the city's argument (Arg., 1402) it is said: "He is considered, perhaps, the greatest national authority on the question of water-supply sanitation."

He disposes briefly of the necessity of the watershed to protect the quality of the water, "As long as (the Merced source) is in daily use for domestic purposes, every acre (within the watershed) ought to be held; if there is any criticism to be made, it is that the company does not own enough" (8344). The drainage works take the bulk of the drainage but some passes through the sand. The fertilization described, he says, would have a tendency to pollute the supply, but far less than would human habitation, even with adequate sewer systems. (8345.) Sewer connections

leak; to make them water-tight, if it could be done, would be very expensive and practically is not done. (8345.) He concedes that the typhoid bacillus would probably not get through the sand (8346), but nitrogen and chlorine from human fecal matter and urine would pass, and induce the growth of organisms in the water that would unfit it for domestic supply. "I think as a result of those conditions the Merced water at the present time is not as good as the other water of the system * * *

The protection afforded against pathogenic germs is rather a risk than a transference; that is to say, if you had a very heavy rain that washed the surface, it would wash out whatever dirt there was on the surface, and it might break some of the lines of defense; [226] I don't know that it has done that, but it might do it. I should feel less comfortable using the water knowing that the population back of those lines of defense was increasing too much." (8347.) Hazen says that hypochlorite of lime is used sometimes to kill pathogenic germs, but it causes a disagreeable taste at best, and with water rich in organic matter like that of Merced it produces offensive tastes and odors. It is used in the East where watershed ownership does not give the necessary protection. Some few eastern cities, like Lynn and Hartford, have large catchment areas; elsewhere it has not been feasible to acquire them. On the Croton watershed in the New York City system there is a permanent population of 25,000 in the watershed of 360 square miles, but all sewage is thoroughly treated and sometimes diverted; strict regulations as to pollutions are enforced by twelve inspectors under supervision; and filtration is now being effected. (8350.) The Ashokan watershed is in the Catskills, having little permanent population, and the problem is handled the same way. However, both in the two New York supplies and at the Boston water supplies, the cities own wide strips around the reservoirs and along the streams. (8351.) When Merced goes into the emergency class, filtration and treatment with hypochlorite should be provided for, and then the city's allowance of 811 acres will be enough. (8352, 8341.) If the soil around Merced had been clay, he doubts if it could be used today. (8353.)

Deciding therefore that the purity of the supply requires the reservation of the Merced watershed from sale and habitation, Hazen nevertheless decides it must be taken into the rating base

at less than its market value. He considers its value from four different standpoints. (8332 seq.)

[227] First he considers sale value of the watershed lands only, including lakes and water rights, taking the figures of other witnesses for this, and including also structures at a reduced valuation of his own. He thus reaches a round figure of \$6,500,000 for lands and \$425,000 for structures or \$6,925,000. This does not include the Twin Peaks tunnel assessment of \$1,631,000, since paid. Included, the sale value would approach \$9,000,000.

It will be noticed that on the master's findings, *i. e.*, watershed, \$5,532,000, less tracts 20, 23, 25, \$402,000, plus lakes \$336,000, and water rights, say \$280,000, the sale value less structures would be \$5,746,000, and taking Hazen on structures, \$425,000, a total of \$6,171,000 without the assessment or \$7,802,000 with the assessment.

Hazen here refers to a sale for other than waterworks purposes, as for residential use with an aquatic park.

Second, Hazen next considers its normal water supply value. This standard measures value by the cost of an equivalent quantity of water from elsewhere delivered at the same level, considering other sources of the company, the projected Hetch Hetchy supply and a Sacramento river source. Estimating in general terms, he figures the cost of the peninsular supplies at \$797,000 per M. G. D. (Exhibit 164, p. 22); Alameda at \$745,000 per M. G. D. for 18 M. G. D.; Calaveras, \$635,000 per M. G. D. for the first installment of 25 M. G. D.; Sacramento river at \$700,000 for 60 M. G. D.; and Hetch Hetchy, not figured in detail, but estimated at more than double the cost of Calaveras water for similar quantities. (Exhibit 164, p. 27.) He adopts as a fair measure for the value of the 3.5 M. G. D. at Merced, \$700,000 a unit or \$2,450,000 less operating expenses capitalized \$490,000, or net normal water supply value, \$1,960,000. [228] Although my findings would change Hazen's figures in detail, there is enough margin in the final approximation, and I think it may be accepted.

Hazen divides this into \$638,000 structures, and \$1,322,000 lands and water rights.

But Merced has a value beyond its value as a source of supply as furnishing nearby storage—its reservoir value. Storage could be increased to 4 billion gallons, with additional pumping facilities. The city's condemnation area of 823 acres with additional works for filtration and chemical treatment, would be sufficient for this emergency storage use. Valuing it at \$1000 per million gallons of

capacity, he gets \$4,000,000, including roughly \$500,000 for new construction, or, net, \$3,500,000 for 823 acres and structures. This may be assumed to be made up of \$638,000 of structures and \$2,862,000 of lands and rights.

Finally Hazen sees a temporary service value. Land of large sale value has been during this period temporarily used to meet indispensable needs. The result has been to postpone the bringing into use of the complete Calaveras system, the initial cost of the first installment of which will be larger in amount than Hazen's estimated sale value of the property. This being so, it seems to him fair to recognize in the rating base a value greater than the permanent or normal water supply value. He knows no method of calculating this, but believing it greater than the normal supply value and less than the present sale value, he adopts an intermediate figure of \$5,000,000, made up of \$4,362,000 for lands and rights, and \$638,000 for structures. He adopts this figure for the lands and rights in the rating base, to be [229] used until Calaveras water is introduced, to be then replaced by a smaller figure based on the emergency reservoir value.

Since I have already valued separately the structures, the reservoir area and the water rights at Merced, and have yet to adjust the value of the watershed, it will be helpful to calculate Hazen's assumptions as to watershed values, implied in these figures. His adopted sale value of \$6,500,000 evidently includes the value of the reservoir area and of the water rights. Deducting Grunsky's value of the reservoir lands, \$336,000, and plaintiff's figure for water rights \$350,000, this would leave \$5,814,000 as Hazen's adopted figure for sale value of the watershed proper. Deducting the same figure, \$686,000, value of reservoir lands and water rights, from his temporary service value used in the rating base, \$4,362,000, we find for the watershed land an allowance by Hazen of \$3,676,000. This is 63.2% of the sale value, or a deduction of 36.8%. Expressed in the form the city prefers, of a deduction of acreage in use, this is equivalent to excluding, say, all the lands south of the lakes, and a wide strip from the lands to the east and north, though not to the extent claimed.

Metcalf corroborates Hazen on the necessity of the inclusion of the Merced watershed to protect the supply. Metcalf at first agreed with Hazen that the fertilization would increase the organic content of the water, an opinion which he later modified; I will refer to the analyses further on. He describes the significance of the

various chemical conditions, and the effect on the water in an instructive way (10968-9). It will be sufficient to remember that albuminoid ammonia in the tests indicates recent pollution, [230] and nitrates and nitrites, a pollution of less recent origin; "in other words, the successive stages of purification conform to the albuminoid ammonia, nitrite and nitrate contents; it would also be likely to be shown in an increased amount of chlorine due primarily to the urine; of course, on the seacoast, the chlorine content is much higher than further inland, but if there was marked increase, it would show in the analysis."

Mr. O'Shaughnessy was the chief witness for the city's contention that 811 acres including the lakes would be a proper area to be included in the land valued. I do not find his testimony at all points consistent with itself or entirely clear, but that may perhaps be conceded to the complexity of the problem. The first point he makes in justifying the exclusion of the watershed is that the land was not "in use", being used not for protecting the supply, but for intensive agriculture, a use inimical to its purity (10716, 10792, 10799). The use of fertilizers, and not the increase of population to the east of the watershed (10504), was the cause of organic pollution which he noted as existent (10789, 10505). Prior to this fertilization, the lands were used as a protective area, and upon this ground Judge Farrington's inclusion of them, as of 1903, was justified (10717, 10730, 10789, 10794).

Obviously, this position is based on a premise that organic pollution filtered through the sands from some distance away from the lakes, for the cultivated portions within a distance corresponding to the narrow margin of the condemnation area (Exhibit 217) were negligible in amount; and if it came from the 118 acre tract [231] (Exhibit 217), it would suggest a wide margin of pollusive sources.

And furthermore, if fertilization were harmful, I cannot bring myself to agree with the city engineer that a substituted habitation would be less harmful, despite his reliance on sewers.

His further position was that even before the farming began, when it was "in use", as stated, it was only ostensibly so (10798); it was not "useful" (to follow the words of the usual formula), or to quote Mr. O'Shaughnessy, not "necessary" (10799, 10725), beyond the 811 acres; that even if it had been in wild flowers, it was not needed, and the company could not have been criticised if it had sold it (10799, 10800, 10775). On this basis, either the

sandy soil must act as a complete filter, which is a position inconsistent with the rest of his testimony; or the witness might mean that the alternative use for habitation could have been rendered harmless by adequate sewers. I have said I could not accept this latter view; and my reasons are not only Hazen's contrary opinion, but the experience shown at the Lobos creek supply.

Lobos creek is a small stream between the so-called Richmond district of San Francisco and the Presidio, or military reservation of the United States. It was long used by the plaintiff as a source of domestic supply, but was abandoned by reason of pollution. As early as 1908 (10974) and apparently in 1916 (10973), its water was badly contaminated by typhoid bacilli. The soil there is dune sand, through which the water infiltrates, and at the earlier date, there was a sparse population. (10974.) Eastman's testimony that this is due to broken sewers (10974) seems not to have been contradicted.

[232] There is not enough testimony in the record to reconcile the filtration of typhoid bacilli through the sand in the Lobos instance with Hazen's opinion that they would not ordinarily pass through the Merced sands, and Hazen had left the stand when this evidence was brought out; nor is it reconcilable with O'Shaughnessy's dependence on sewers, partly cast-iron with lead joints, and partly the ordinary kind. (10781.)

Another important piece of evidence, introduced after Hazen's departure, was the table of analyses by the public authorities of the Merced water, covering the period from September 19, 1900, to December 22, 1915 (Exhibit 223). The years 1902, 1903 and 1904 are lacking and there were few tests each year in the period prior to 1908. These tables show that in the elements significant of past or recent pollution, namely, chlorine, nitrites, nitrates, albuminoid ammonia, and free ammonia, there has been no appreciable change through the years 1900 to 1915 inclusive. Metcalf says, referring to his former statement that the manuring would tend to an increase of organic content:

"I have to confess that I was wrong in my statement with regard to what the analyses showed. I am a little surprised at it, because I should have expected to see some increase in the organic matter as a result of the manuring of these lands, but the analyses don't show it; the purification seems to be sufficient in the sand through which it passes to remove its effect." (11092.)

Metcalf offered to introduce the analyses of other sources, but the master unfortunately thought it unnecessary (11093); it would be helpful to compare the analyses of the purer water with those of water admittedly inferior. But evidently these tables apparently show that the fertilization as [233] conducted in the latter part of the period here concerned, was not injurious to the quality of the water, and that Dr. Blue was right.

If we assume the proposition that if the Merced sands are a complete filter both of pathogenic bacteria and of organic matter then they are not necessarily held free of human habitation, and if we on that ground alone decide the question of exclusion, we thus find the evidence in considerable conflict. Hazen thinks it likely that typhoid bacilli would not pass; the Lobos creek experience seems to show the contrary. Both Hazen, and O'Shaughnessy (apparently), and Metcalf in his first opinion, believe that organic matter deleterious to the purity of the water would pass through the sands; the analyses seem to show a rather complete filtration of organic matter applied upon the surface. But again to rebut this, the fact is that the water is actually inferior by reason of its contained organic matter, which could only come through the sands. It is evident that the evidence is not complete. It cannot be said that it has been *demonstrated* in the facts that the watershed is necessary for a protective area. But it will be noted that Hazen states the problem of protection in terms of *risk*, which seems a common-sense way of looking at it. If, therefore, this question of exclusion of the Merced lands rested on the point of necessity alone, I should, in view of the conflicting facts, accept Hazen's opinion, giving decisive weight to the authority with which he speaks; and would thus deem the lands usefully employed to guard the supply, on the ground that it would be an unwarranted risk for the company to have acted otherwise.

But the point need not be decided on this ground alone. We [234] have been proceeding thus far according to hindsight, not according to foresight. The city's contention for exclusion means that in any year from 1907 to 1915, the company should have sold this land and thrown it open to human habitation. Obviously with the increase of surrounding population, the need of protection would increase with the years. But taking 1907 when the need was less apparent, and putting ourselves in place of the company's officers, would they have then been justified in a sale of this watershed? The city refers to the experience of near-by

subdivisions to prove that habitation would have been scattered and of slow growth; and doubtless this has proven to be likely. But I doubt if this could have been foreseen with certainty. Even in 1915 or at present when the Twin Peaks tunnel is about completed, who could be sure of the extent of habitation before Calaveras water may come in? It must not be forgotten that if the land were sold, it could not readily or economically be re-acquired if the decision proved unwise. I cannot escape the conclusion that, having the expert advice and the facts before them, especially if those facts were as conflicting as they are here, and considering also the reports of the city's engineers, the officers of the company acted reasonably and with a wise regard for the public health in keeping the Merced watershed in service. And for this, the company should be compensated in the rates.

Having thus decided that all the Merced land except that on the ocean front, was properly retained as a protective area, it remains to determine the amount of its market value which should be deducted as an excess above normal plant requirements. [235] Hazen's method described before of fixing its present worth on the basis of temporary service value is approved; and his percentage of reduction, 36.8%, may, it seems, fairly be applied to my findings as to market value. Referring to Appendix 1, which shows a total appraisal of the Merced watershed on December 31, 1913, of \$5,532,231, we must deduct the lands outside the watershed, viz., tract 20, \$8,466, tract 23, \$126,060, and tract 25, \$267,750, a total of \$402,276, leaving \$5,130,000 as the market value of the watershed. Applying Hazen's percentage of 63.2% we obtain \$3,242,160 as the value to be allowed in the final rating base.

Revising the table on page 32 of this report, we obtain the following values to be used in the different years here concerned:

1914-15}	100%	\$3,242,160
1913-14}		
1912-13}		
1911-12	90%	2,917,944
1910-11	85%	2,755,836
1909-10}	75%	2,431,620
1908-09}		
1907-08}		

Compared with Hazen's figure of \$5,000,000 for Merced lands, rights and structures in 1913, I should say that, on a rough ap-

proximation of my allowances for reservoir value, water rights and structures elsewhere, my corresponding figure is somewhat under \$4,500,000; and in 1907, about \$3,645,000. It may be noted that the resulting allowance for watershed and reservoir area in 1907, \$2,767,620, is considerably less than Judge Farrington's [236] valuation of Merced lake and watershed areas, as of 1903, at \$4,382,600. (192 Fed. 166.)

As stated before in discussing Hazen's estimates, this deduction from market value is equivalent in result to cutting off a very substantial margin on the basis of area.

Peninsular Lands

This refers to the lands heretofore appraised in detail in Appendix 2, the watershed protecting and producing the supply at the three great reservoirs. In general, it is agreed that lands outside the watershed line should be excluded, and only those. The only substantial conflict concerns the exclusion of the non-watershed part of parcel 90. As to this I have allowed part just below the dam.

The following table shows the exclusions from Appendix 2 (see Exhibit 166, 213):

Parcel	Acres excluded	Value excluded
28.....	216.16	\$ 2,810
29.....	all	16,491
33.....	all	3,070
43.....	184.69	7,388
101.....	166.	2,490
128.....	all	959
138.....	all	3,529
62.....	all	6,475
90.....	150.	52,500
91.....	all	4,282
102.....	80.	2,000
194.....	274.	27,400
195.....	367.	36,700
205.....	243.	24,300
211.....	263.	26,300
210.....	129.	12,900
208.....	46.	6,900
		<hr/>
		\$236,494

The table of values of the lands in Appendix 2, shown above on page 38, noting all exclusions, and applying agreed percentages, [237] has been revised, with the following results:

1914-15}	
1913-14}	\$2,027,649
1912-13}	
1911-12.....	1,925,295
1910-11.....	1,793,985
1909-10.....	1,675,892
1908-09.....	1,594,788
1907-08.....	1,556,607

Miscellaneous Lands in San Mateo County—

Appendix 2 b.

The exclusions are:

Parcel	Acres excluded	Value excluded
158.....	all	\$13,588
157}		
156}	1,740.30	52,952
155}		
154}		
		<hr/>
		\$66,540

The table on page 39, *supra*, showing adjusted value for different years, is revised as follows:

1914-15}	
1913-14}	\$278,381
1912-13}	
1911-12.....	264,462
1910-11.....	250,543
1909-10.....	236,624
1908-09}	
1907-08}	165,020

Pleasanton Lands—

Appendix 3, Map 10.

These lands will not suffer any exclusion; the question has been fully discussed in connection with water rights.

[238]

Niles Canyon Lands

Appendix 3, Map 11.

The lands in this portion of Niles canyon below the Sunol dam, valued at \$35,596, are useful in support of water rights or as rights of way. The valuation elsewhere under those titles covers the value in these lands. The entire appraised value, \$35,596, will be excluded.

Calaveras, Upper Alameda, Sunol Drainage, San Antonio and
Arroyo Valle Lands

Appendix 3, Maps 12, 13, 14, 15, 16, 17, 18, 18a.

All of these lands except the upland area of the Nusbaumer parcel, tract 290, and the Stone piece, parcel H239, were included by the city and its officers in the areas sought to be condemned in 1913 as lands in use. In the cases at bar, O'Shaughnessy, in addition to the two tracts named, excludes from the useful areas all the Calaveras, Upper Alameda, San Antonio and Arroyo Valle lands, and lands in the Sunol drainage area, so-called, southerly from the De Saissett tract, parcel M 239. (See map, Exhibit 206.) Dillman concurs in these exclusions, but believes that in an addition to value of \$1,475,000 which he makes in his final summed-up appraisal for "all possible errors, land and fencing for protection from pollution", he has made sufficient allowance to cover the acquisition of lands and the fencing of strips along the banks of the streams whose waters flow to Sunol. It is obvious from my findings that this allowance is not sufficient to cover the item of errors alone. Quite apart from the question of its efficacy as a sanitary measure, it is evident that the segregation of strips along the streams would cut the heart out of lands valuable for farming and cattle-raising, and that there would be substantial severance damages. The record presents no evidence of what this amount would be. I could give effect to this suggestion, therefore, [239] only by including all parcels touching the streams, and, in addition, making a guess at the cost of fencing. I have made no computation of the amount that would be excluded on this plan, but a survey of the maps convinces me that it would affect cheap lands for the most part, the total amount of which would not justify the loss in assured protection of the water. In this state of the evidence, the question of allowing only strips along the streams may be dismissed from further consideration.

It is also suggested by the city's witnesses that statutory provisions forbidding the pollution of streams and the filtration possibilities of the Sunol gravels are considerations which render unnecessary the holding of large watershed areas as protective agencies.

The statutory provisions are referred to in general terms. I assume that Penal Code, California, sections 374, 377, 377a, 377b, and the Public Health Law, approved March 23, 1907, amended April 1, 1911, and June 13, 1913 (see Act 2830, General Laws, 1915, p. 1345), are the laws in mind. They make unlawful the pollution of water supplies. The code provisions make such offenses misdemeanors punishable by fine or imprisonment. The public health law gives extensive jurisdiction in such matters to the state board of health, and provides remedies by summary abatement and by injunction. The code section has been in force since 1872, and it is evident that the water company, in pursuing its policy of acquiring large protective areas since that date, has acted in the belief that the penal statutes are not, of themselves, adequate protection. This seems to be a just conclusion; such laws act after the mischief is done, and, moreover, are of the class of such statutes as [240] that against spitting upon streets and sidewalks, enforced with difficulty and sporadically, and of only partial efficacy. The public health statute is plainly more effective in its remedies. It may be noted that it was passed after most of these lands were acquired and devoted to the public service.

It will doubtless not be argued that the mere existence of such statutes to protect public health and of state instrumentalities to enforce them is other than one element in the determination of the usefulness of these watersheds, and not a decisive reason for their exclusion from the rating base. Otherwise the city would not have conceded the usefulness of the extensive watersheds around the peninsular lakes, or of considerable areas around the Sunol gravel beds. The question thus is as to the reasonableness of the employment of this property as a protective agency additional to and far more effective than statutes; that these lands were in good faith used by the plaintiff in pursuance of its public duty to furnish wholesome water is very clear. Whether there exists in any state agency the authority of law to compel a water company on the one hand to acquire, or, on the other, to sell, lands deemed adapted to protect the sources of supply, I do not know. It is evident that the municipality of San

Francisco has never so acted. The responsibility being thus cast upon the purveying water company, it seems to me inevitable that a court, sitting to determine the reasonableness of rates of charge, will incline to give effect to the company's decision in good faith, and will include the protective watersheds as property entitled to a return, unless lack of usefulness or extravagance in the amount of capital employed plainly requires the exclusion.

[241] Hazen says that the gravels at Sunol "have quite a strong tendency to filter out impurities". (8410.) The situation thus resembles that at Merced, and the same need of protection would nevertheless exist. It would seem that the sand at Merced would provide a much more effective filter than the stream gravel of the Sunol beds. Both Hazen and Metcalf deem all these lands, except Arroyo Valle, necessary for protective purposes.

Regarding the Calaveras and Upper Alameda lands, Hazen says (8398):

"The Calaveras reservoir land includes the Upper Alameda creek. I did not feel like separating these. It is all one property. It will all be used. I don't think anyone would be justified in building the Calaveras dam without owning the whole of that property. It is true it won't contribute to the Calaveras water until it is diverted, but I have the feeling that a reasonable reserve connected with the property is part of the property. There is not any water works structure you build absolutely for present needs. If you are laying a pipe in the street and you look ahead for a certain distance in the future, you lay a pipe to meet the present needs and the immediate needs will be fully served with a 6-inch pipe; but you lay an 8-inch pipe; the difference between the 6-inch pipe and the 8-inch pipe in a certain sense is reserved property. If you build the Calaveras pipe line, you want a certain quantity of water but you don't build the pipe for that quantity; you look ahead and build a pipe for the quantity that will be needed a few years hence. That is the ordinary prudent way of doing it. When it comes to lands it seems to me it is the same thing; the Upper Alameda lands are part of the Calaveras property; they are necessary in the full development. If the Spring Valley Water Company were to go ahead building the Calaveras reservoir without owning them, some speculators would go up there and buy them and it would be a very unfortunate situation. It is obviously much better

to get them in advance and hold them. As long as the amount is not unreasonable with respect to the whole business, it is my judgment that they are part of the property."

Hazen has in mind here the plan of development whereby the waters stored by the Calaveras dam will be diverted by the first [242] pipe line built; the second instalment of construction being adapted to divert from the Calaveras reservoir the additional waters to be obtained from the Upper Alameda canyon by a dam there and a tunnel through the Oak Ridge to the Calaveras reservoir.

In my judgment, all these lands last mentioned should be deemed useful and so be included in the rating base. The Upper Alameda lands should be included for two reasons; first, as a protective area for the Sunol diversion, and, second, for the reasons stated by Hazen. A rough calculation would indicate that I have found values for these lands aggregating approximately \$30,000. The Calaveras lands should be included for two independent reasons: First, they are presently useful as part of the protective watershed of the Sunol diversion; second, even if they were not useful as regards the Sunol waters, they constitute the reservoir and necessary protective area of a new supply now under construction, and would be, to use Judge Farrington's test, a necessary reserve for wants that were near at hand, in the period 1907-15.

I shall follow Judge Farrington in including the San Antonio lands in the so-called Sunol drainage area that are within the watershed tributary to Sunol. It seems to me very desirable to keep free from habitation and under control all such lands because of their proximity to the Sunol diverting point. Part of the Stone tract, parcel H 239, is outside the watershed and below the Sunol dam, just how much does not appear to my knowledge. If about half the appraised value of the parcel be deducted, it would appear from the maps to be liberal to the city; I shall [243] accordingly deduct \$20,000, the appraised value being \$41,026. (App. 3, Map 12.) No deduction will be made on account of the Nusbaumer tract, parcel 290; this is within the watershed not far from Sunol, is very attractive for summer homes, and, it seems to me, is wisely kept under control.

I shall likewise follow Judge Farrington in excluding from lands presently useful the Arroyo Valle lands, including also the

two detached parcels below the canyon proper. These lands fulfill no function as a protective area for the Pleasanton or Sunol diversions because of their distance and of the great extent of intervening uncontrolled land. (Metcalf, 10385.) They are a reserve, to be used some time in the indefinite future. The appraised value to be deducted is \$71,108 (Appendix 3, Map 14), an average of \$13 per acre for the 5473.37 acres. Considering the vast amounts involved in this entire property, the inclusion or exclusion of this item is not likely to be of material importance. In the Farrington decision, where watersheds throughout were appraised at \$100 per acre, the matter was of more moment, and the necessity for a strict interpretation of the rule as to reserves was more pressing. The property is a very desirable one from the standpoint of both parties, and both are to be congratulated that the plaintiff owns it. I am frank to say that my judgment inclines to allowing the value of this cheap but very desirable property in the rating base, even if its employment is not likely for twenty years; but I shall nevertheless concede the city's contention and follow the precedent in the former case. Perhaps my state of mind may be indicated by saying that if this were a rate-fixing tribunal the lands would be [244] allowed a return in the rates; but as this is a court, the stricter rule seems properly followed.

The total exclusions are, therefore:

Niles canyon lands.....	\$35,596
Stone tract, part.....	20,000
Arroyo Valle lands.....	71,108

Total\$126,704

In the table summarizing the appraisal of these lands, shown heretofore on page 42 of this report, one of the Arroyo Valle tracts, N 268, acquired in April, 1911, value \$18,909, has already been deducted in the years preceding 1911-12. That table will now be revised, allowing for exclusions, to read as follows:

1914-15	\$3,170,228
1913-14	3,170,228
1912-13	3,170,228
1911-12	3,048,645
1910-11	1,499,007
1909-10	1,488,832
1908-09	1,480,885
1907-08	1,480,885

Summary of Exclusions.

Selecting the year 1913-14 as the one most suitable for the illustration, the value excluded from the total of land values, either on account of lack of present use or of abnormal market value, may be summarized thus:

San Francisco lands.....	\$151,394
Merced, ocean slope.....	402,276
Merced, watershed	1,887,840
Peninsular watershed	236,494
Miscellaneous San Mateo lands.	66,540
Niles canyon lands.....	35,596
Arroyo Valle lands.....	71,108
Stone tract, part.....	20,000
	<hr/>
	\$2,871,248

[245]

Summary of Appraisal of Properties Used and Useful by Fiscal Years.

Before considering the question of the additional value of these properties, if any, as properties of a going business, and before considering whether, from other points of view, the total of the appraisal represents the fair value of the entire property in the years in question, it will be useful at this point to summarize the results of our work, as follows:

Lands—	1907-08	1908-09	1909-10	1910-11
San Francisco	\$1,015,290	\$1,015,290	\$1,015,290	\$1,015,290
Merced	2,431,620	2,431,620	2,431,620	2,755,836
Peninsular water- shed	1,556,607	1,594,788	1,675,892	1,793,985
Peninsular miscel- laneous	165,020	165,020	236,624	250,543
Alameda	1,480,885	1,480,885	1,488,832	1,499,007
Rights of way.....	250,000	250,000	250,000	250,000
Reservoir lands, p. 84.	2,556,625	2,556,625	2,556,625	2,687,250
	<hr/>	<hr/>	<hr/>	<hr/>
Sub-total lands, rights of way and reservoirs..	9,456,047	9,494,228	9,654,883	10,251,911
Water rights	1,987,500	2,070,000	2,392,000	2,488,000

Lands—	1907-08	1908-09	1909-10	1910-11
Structures, depreciated	19,186,000	19,169,000	19,084,000	18,994,000
Calaveras dam ....	.....	.....	.....	113,854
Inventory and working capital..	390,000	390,000	390,000	390,000
Totals	\$31,019,547	\$31,123,228	\$31,520,883	\$32,237,765

[246] Summary (cont'd)

Lands—	1911-12	1912-13	1913-14	1914-15
San Francisco	\$1,015,290	\$1,015,290	\$1,015,290	\$1,015,290
Merced	2,917,944	3,242,160	3,242,160	3,242,160
Peninsular watershed	1,925,295	2,027,649	2,027,649	2,027,649
Peninsular miscellaneous	264,462	278,381	278,381	278,381
Alameda	3,048,645	3,170,228	3,170,228	3,170,228
Rights of way.....	250,000	250,000	250,000	250,000
Reservoir lands, p. 84	2,817,875	2,948,500	2,948,500	2,948,500
Sub-total lands, rights of way and reservoirs..	12,239,511	12,932,208	12,932,208	12,932,208
Water rights	2,788,000	2,822,000	3,060,000	3,060,000
Structures, depreciated	18,887,000	18,851,000	18,737,000	18,559,000
Calaveras dam	154,032	197,097	514,304	672,034
Inventory and working capital..	390,000	390,000	390,000	390,000
Totals	\$34,458,543	\$35,192,305	\$35,633,512	\$35,613,242

[247] Going Value—Development Expense

From the necessities of the case the appraisal thus far has proceeded by units—lands, structures, rights, owned, used and useful in water supply. Except in so far as depreciation has been deducted, the total value found is that of a new water works without business, but ready to begin the acquisition of its business; whereas, the fact is that the plaintiff's plant is a going concern which has passed through the risks that are attendant upon a new business, and which has an established market and earning power. Such additional value, if it is to be recognized here, is obviously not of a

separate element in the plant, as is a conduit or a reservoir, but of the plant as a whole; an intangible value, a characteristic of the unified business structure, inhering in every part. We are here concerned, however, to estimate this value, if possible, as if it were a separate thing.

A word should be said as to the phrasing of the title of this subdivision of the report. Going Value and Development Expense are not synonymous. One is value; the other is cost, either actual, where the norm of value is actual investment in plant, or hypothetical or reproduced, where the valuation is by present market value, or reproduction cost. The going value may be greater or less than the expenditures and losses in developing the going business; but it will be useful to consider these development costs in forming our judgment as to going value.

The positions of the parties at bar are diametrically opposed. The water company contends that the law requires that the going value should be given substantial recognition in the capital entitled to a return, and, specifically, that \$3,400,000 is the additional sum to be allowed in the appraisal for 1913-14. The city, while not denying that a going business is worth more than one without business, contends that when the appraisal has been made by reference to market value in the case of lands and rights, and to reproduction [248] cost less depreciation in the case of structures, full recognition in value has been given to the going value of the business in which they are employed, since if the business were not a going one, the unified property would have only a scrap or dismemberment value, admittedly much less. It is also suggested that going value exists only when the state has allowed a return higher than it was compelled by law to allow, the so-called "liberal" rate; this value being measured by the capitalized difference in return between this "liberal rate" and the "fair rate," which the courts would deem necessary under the 14th Amendment. It would follow that what was thus created as a matter of grace could be destroyed at discretion. These, I think, are fair statements of the views of Mr. Dillman, the city's engineer witness. Mr. Searls, the city's counsel, lays rather more stress in argument on the view that the value of the company's property, on the basis of present market value and reproduction cost, reflects and is inextricably connected with the existence of the city of San Francisco and of the company's established business. If the company were not a going concern, supplying water for many years past, the city would not

exist; and without the city's growth, the company's property (and clearly its realty) would not have its present value. It is also contended that the Supreme Court, in the Des Moines Gas Company's case, has laid down the principle that when a valuation has proceeded according to reproduction cost methods, and allowance has been made for overhead expenditures, the value of the going concern is adequately recognized.

In *Bonbright v. Geary*, 210 Fed. 44, 54, 56 (D. C. Ariz., 1913), in an opinion awarding a preliminary injunction, Judge Morrow, resident Circuit Judge in San Francisco, said that a going value should be allowed, but that, though often presented to him, he had never been able to determine a proper amount upon the evidence submitted; and Judge Van Fleet, of this court, said:

"All that we are agreed [249] upon is that upon principle there should be a greater value attachable to a going concern than one which is merely in its initiative and not enjoying the benefit of patronage."

I shall review the authorities in the pages that follow; but it may be said now that the remarks of the learned judges just quoted well summarize the state of the law, namely: that the going value should be given recognition in the appraisal in the normal case, and, secondly, that it is most difficult to reach the amount to be allowed, or to point out a method of estimation that is free from objection.

I do not read Judge Farrington's opinion in the 1903 case (*Spring Valley Waterworks v. San Francisco*, 192 Fed. 166) as a variance from these conclusions. He states that "the fact that complainant's plant * * * is a going business is an element of value"; and announces his agreement with Justice Brewer's statement in the Kansas City case, that the "mere cost of purchasing the land, constructing the buildings, putting in machinery, and laying the pipes in the streets, in other words, the cost of reproduction, does not give the value of the property as it is today." This must mean that an additional value must be added to the aggregate of appraisals of the separate elements, the cost of reproduction. But the learned judge made no such allowance that is ascertainable to the reader of the opinion. He criticises the theories of valuation offered in the record, and concludes, as I understand him, that the evidence gives him no assistance. If the record in this case shall likewise prove uninformative, the same result must follow. But the court says:

“Probably nothing further is needed to demonstrate, *for this case at least*, the utter futility of attempting to establish a separate and distinct valuation for going business. The burden was on complainant, if it wished such an independent valuation, to produce the evidence on which it could be based; but no such evidence has been called to my attention” [250] (emphasis mine).

He further stated that while he could fix no definite value for the element of going business value, he would consider that fact in fixing the values of the various items of property, as a “characteristic” of those items. It must be conceded that this and the language referring to the futility of fixing a separate value for the going concern element, suggests that the judge approved and followed the method of valuation by reproduction cost alone; but it must also be pointed out that this would be contradictory of the principle of the Kansas City case, quoted with approval earlier. I conclude that the matter of a separate and additional allowance for going value failed on the proofs offered; and that it is left open by Judge Farrington to allow such a value in a proper case.

It is the intangible nature of the going value which makes it difficult to prove. But while the court cannot guess, in the absence of evidence, or speculate toward a result based upon unreliable testimony, the inherent difficulty of proving with precision the value of intangible property does not justify ignoring it entirely, even in such a proceeding as this. A large part of the aggregate wealth of the world is intangible, without separable market value or ascertainable reproduction cost. In *Adams Express Co. v. Ohio*, 166 U. S. 185, the Supreme Court sustained the taxation of an express company upon an assessment of property largely in excess of the value of the tangible property. The intangible value is at one place in the opinion ascribed to franchises, and in another to good will; the name is not important. Justice Brewer, delivering the opinion of the court, said:

“In the complex civilization of today a large portion of the wealth of a community consists in intangible property (218). * * * Whenever separate articles of tangible property are joined together, not simply by a unity of ownership, but in a unity of use, there is not infrequently developed a property, intangible though it may be, which in value exceeds the aggregate of the value of the separate pieces of tangible property. (219.) * * * To say that there can be no such intangible property, that it is some-

thing of no value, is to insult the common intelligence of every man. (219.) * * * This is eminently a practical [251] age; courts must recognize things as they are and as possessing a value which is accorded to them in the markets of the world." (225.)

And in *Cleveland etc. R. Co. v. Backus*, 154 U. S. 439, 444, also a case of taxation, the Supreme Court said:

"The true value of a line of railroad is something more than an aggregation of the values of the separate parts of it, operated separately. It is the aggregate of those values plus that arising from a connected operation of the whole."

I deem it important to trace as briefly as may be the course of the decisions of the Supreme Court touching the question of going value.

Reference should first be made, however, to a decision of the Circuit Court of Appeals of the Eighth Circuit, important because the opinion was rendered by Circuit Justice Brewer, and was later approved by the Supreme Court in another case. In *National Waterworks Co. v. Kansas City*, 62 Fed. 853, decided in 1894, the earliest leading case on the subject, there was involved a valuation for purchase by the municipality under the terms of a franchise which had expired. The court inquired as to what was "the fair and equitable value." I quote (865):

"The original cost of the construction cannot control, for 'original cost' and 'present value' are not equivalent terms. Nor would the mere cost of reproducing the waterworks plant be a fair test, because that does not take into account the value which flows from the established connections between the pipes and the buildings of the city. It is obvious that the mere cost of purchasing the land, constructing the buildings, putting in the machinery, and laying the pipes in the streets—in other words, the cost of reproduction—does not give the value of the property as it is today. A completed system of water works, such as the company has, without a single connection between the pipes in the streets and the buildings of the city, would be a property of much less value than that system connected, as it is, with so many buildings, and earning, in consequence thereof, the money which it does earn. The fact that it is a system in operation, not only with a capacity to supply the city, but actually supplying many buildings

in the city—not only with a capacity to earn, but actually earning—makes it true that ‘the fair and equitable value’ is something in excess of the cost of reproduction. * * * The city, by its purchase, * * * steps into possession of a property which not only has the [252] ability to earn, but is in fact earning. It should pay therefor not merely the value of a system which might be made to earn, but that of a system which does earn.”

The Circuit Court had found a value based on cost of reproduction of \$2,714,000. The Court of Appeals, “after much discussion, comparison of figures and readjustments,” raised this figure to a round \$3,000,000, thus valuing the element due to going value at \$286,000, or about 10.5% of the value of the plant upon the basis of reproduction cost alone.

In *Knoxville v. Knoxville Water Co.*, 212 U. S. 1, decided in January, 1909, the court “assumed without deciding,” that an item of \$60,000, for going concern value, was properly included, reversing the decision upon other grounds. The only importance of the opinion upon this subject is in Justice Moody’s definition of the meaning of the term “going concern value” (p. 9):

“The latter sum we understand to be an expression of the added value of the plant as a whole over the sum of the values of its component parts, which is attached to it because it is in active and successful operation and earning a return.”

It may be noticed also, for what little it may be worth, that \$60,000, the going value allowed in the lower court, was about 9% of \$538,000, the undepreciated value of the tangible capital.

In *Willcox v. Consolidated Gas Co.*, 212 U. S. 19, 52, decided on the same day as the Knoxville case, the question of “good will” value and franchise value was passed upon. The master had allowed \$20,000,000 for the two items. Judge Hough, in the Circuit Court, 157 Fed. 872, and Justice Peckham, concurring with him in the Supreme Court (p. 52), decided that the concept of “good will,” the tendency of the customer to resort to the “old stand,” and the value ordinarily recognized therein in mercantile transactions, could not be applied where the company had a monopoly in fact. The Supreme Court said nothing about the value of the [253] going concern in any other sense. Since this case it has not been customary to consider good will as a matter of valuation where public service corporations enjoy a monopoly of the field. But

since, in considering the subject in hand, we are faced with the difficulty of defining a value for an intangible item of property, it will be well to note the disposition made in this case of the similarly intangible item of franchise value. Judge Hough's opinion discloses doubt as to whether the franchise should be capitalized, but considered that the question was foreclosed by authority in favor of such an allowance. He found that when the gas company was formed, in 1884, by acquisition of the plants and franchises of pre-existing gas companies, under authority of an act of the legislature of New York, stock of the par value of \$7,781,000 was issued representing the franchises; that tangible property worth \$30,000,000 in 1884 had increased in value to \$47,000,000 at the time in suit, and that the franchises should similarly be considered to have increased in value to \$12,000,000 (p. 879). The Supreme Court agreed that the owners of the stock representing the franchise value of \$7,781,000 agreed upon between the companies "had a right to rely upon legal protection for legally issued stock," "though the franchises" had never cost a single penny; that "it cannot be disputed that franchises of this nature are property, and cannot be taken or used by others without compensation" (p. 44); that, however, the lower court's assumption of an increase of value was too speculative and was opposed to the state's power to regulate (p. 45). The court accordingly fixed the franchise value at the figure of \$7,781,000 (p. 47), with the cautionary remark that the decision rested on the peculiar facts of the instant case, and could "form no precedent in regard to the valuation of franchises generally, where the facts are not similar to those in the case before us" (p. 48). The tangible property was valued at \$47,831,435; the franchise [254] value was therefore about 16% of this amount.

Both the Willcox and the Knoxville cases were appeals to the respective Circuit Courts.

Omaha v. Omaha Water Co., 218 U. S. 180, decided in 1910, was on *certiorari* to the Circuit Court of Appeals for the Eighth Circuit, which had reversed a decree of the circuit court dismissing the bill and had remanded the cause. The suit was for specific performance of a contract of purchase which provided for a valuation by a board of appraisers. In affirming the decree of the court of appeals, Justice Lurton read the opinion of the Supreme Court. I quote as follows (pp. 202-3):

"The appraisers, in making their estimate of valuation, including \$562,712.45 for the 'going value.' This separa-

tion of an element contributing to the value of each tangible part was done because required to be done under an order made in the circuit court. * * * The option to purchase excluded any value on account of unexpired franchise, but it did not limit the value to the bare bones of the plant, its physical properties, such as its lands, its machinery, its water pipes or settling reservoirs, nor to what it would take to reproduce each of its physical features. The value, in equity and justice, must include whatever is contributed by the fact of the connection of the items making a complete and operating plant. The difference between a dead plant and a live one is a real value, and is independent of any franchise to go on, or any mere good will as between such a plant and its customers. That kind of good will, as suggested in *Willcox v. Consolidated Gas Co.*, 212 U. S. 19, is of little or no commercial value when the business is, as here, a natural monopoly, with which the customer must deal, whether he will or no. That there is a difference between even the cost of duplication, less depreciation, of the elements making up the water company plant, and the commercial value of the business as a going concern, is evident. Such an allowance was upheld in *National Waterworks Co. v. Kansas City*, 62 Fed. 853, where the opinion was by Mr. Justice Brewer. We can add nothing to the reasoning of the learned justice and shall not try to. That case has been approved and followed in *Gloucester Water Supply Co. v. Gloucester*, 179 Mass. 365, and *Norwich Gas & Electric Co. v. Norwich*, 76 Conn. 565. No such question was considered in either *Knoxville v. Knoxville Water Co.*, 212 U. S. 1, or in *Willcox v. Consolidated Gas Co.*, *supra*. Both cases were rate cases, and did not concern the ascertainment of value under contracts of sale."

The decision is of capital importance. It settles these points, where the valuation is for purposes of sale: (1) that "going value," though an element contributing to the value of each tangible part of the entire property, may properly be estimated [255] separately; (2) that it exists over and above the values of the aggregate tangible properties, even if those values be ascertained as the cost of present duplication, less depreciation; (3) that it is a value that exists independent of the existence or value of a franchise or of "good will."

It has been contended that the explicit limitation of the prin-

ciples stated to sale cases, distinguishing the Willecox and Knoxville cases as rate cases, points to a different rule in the latter class. I read the language simply as reserving the question for decision until the point arose in a rate case. And, as will be seen later, the application of these principles to a rate case was affirmed in the Des Moines gas case, *infra*. Obviously, the attempted distinction is impossible in reason, for in such case, as Judge Hough says, quoting Justice Brewer in *Ames v. Union Pacific Ry. Co.*, 64 Fed. 178, "owners are in worse position when regulated than when their property is condemned outright." (*Consolidated Gas Co. v. New York*, 157 Fed. 876.)

It may be noticed, for such assistance as it may afford, that the ratio of the sum allowed for going value in this case, \$562,712, to the value of the tangible property, \$5,700,583 (see 162 Fed. 227, where the total appraisement is stated at \$6,263,295) is 9.8%.

Cedar Rapids Gas Light Co. v. Cedar Rapids (1912), 223 U. S. 655, the next case in order, is one that unfortunately has been productive of confusion in a matter that was beginning to grow plain. An action was filed in the District Court of Linn County, Iowa, to enjoin the enforcement of an ordinance of the city of Cedar Rapids, fixing rates for gas service. The petition was dismissed after hearing and the plaintiff appealed to the Supreme Court of Iowa. That court concurred in the dismissal, with the modification that it was made without prejudice to a new action after actual trial of the results of the ordinance. (120 N. W. 966.) The case was then carried on writ of error to the Supreme Court [256] of the United States upon the Federal question presented. It should be noted at this point, as the Supreme Court of the United States pointed out (p. 668), that the jurisdiction of that court to review the decision of a state court on writ of error is quite different from its jurisdiction and powers where, in the proper cases, the matter is brought before it by appeal. Findings, either at law or in equity, of a state court, will be re-examined by the Supreme Court of the United States upon writ of error as to errors in matters of law only, and not as to matters of fact (citing *Egan v. Hart*, 165 U. S. 188, 189; *Dower v. Richards*, 151 U. S. 658, 663; *Adams v. Church*, 193 U. S. 510, 513, and others); although Justice Holmes points out that questions of law arise from rulings as to the admissibility of evidence, or where the sufficiency of the evidence to warrant the conclusion is denied or where the conclusion is a mixed

question of law and fact, as of ownership, and that in such cases the evidence may have to be examined.

It is necessary first to examine the opinion in the state court. It does not disclose distinctly the valuations respectively contended for. At page 969 of 120 Northwestern it is said:

“Also the sum of \$100,000 was included by these (plaintiff’s) witnesses as enhancement of value by reason of being a ‘going concern.’ ”

And at page 970, the state court said:

“The plaintiff’s chief expert estimated the *physical* properties to be worth \$365,564.41, and the petition alleges *these* to be \$368,000. The defendant conceded the value of *the plant* to be 278,621.60. It had cost but \$267,500.” (Emphasis mine.)

After having disapproved many items of plaintiff’s appraisal, the court (p. 971) spoke of exaggeration in the estimates, and concluded thus:

“A careful review of the entire record, which has been repeated, has led to the conclusion that a fair valuation of the entire plant is somewhere between \$300,000 and \$350,000. This is largely [257] in excess of its cost, but according to the record, the value of material as well as the cost of labor has greatly increased since much of the plant was constructed. On the other hand, to put the value above the limit mentioned would require us to ignore the depreciation due to age, decay, inadequacy and the like, on account of which defendant (? plaintiff) has been charging off its books large sums, and which the proof shows should be taken into account.”

Does this indicate that the value found included any value, as claimed, for the going concern element? In view of the language, especially the portions emphasized by me above, it seems to the master that the court did not so intend; but the opinion is not clear-cut, and a contrary view has been taken. My opinion seems to me to be confirmed by what the court says specifically on the question of going value, which I quote (p. 969):

“Also the sum of \$100,000 was included by these witnesses as enhancement of value by reason of being a ‘going concern.’ As previously intimated, the value of the plant is to be estimated in its entirety rather than by the addition of estimates on its component parts, though the latter

course will materially aid in determining the value. Advantages have accrued through the sagacity of its management as contended by appellant. So, too, there are the inevitable mistakes which would not be likely in the construction of a new plant; but to put a new plant in profitable operation time would be required, and, aside from the intangible element of good will, the fact that the plant is in successful operation constitutes an element of value. As said, the value of the system as completed, earning a present income, is the criterion. In so far as influenced by income, however, the computation necessarily must be made upon the basis of reasonable charges, for whatever is exacted in excess of this is to be regarded as unlawful. Save as above indicated, the element of value designated a 'going concern' is but another name for 'good will,' which is not to be taken into account in a case like this, where the company is granted a monopoly. (*Cedar Rapids Water Co. v. Cedar Rapids*, 118 Iowa 234, 262; *Willcox v. Consolidated Gas Co.*, 212 U. S. 19.) The witnesses for plaintiff took into account 'good will' in giving their opinion of the enhancement in value because of being a going concern, and *we have no means of separating these so as to ascertain their estimate of the separate advantage of completion so as to earn a present income.*" (Emphasis mine.)

It seems to me very plain that this language of the Iowa court means: (1) that going value is an element of value "aside [258] from" and additional to the value implied in the term "good will"; (2) that the former should be taken into account in the appraisal, though the latter may not be, where monopoly exists; but (3) where the record shows an estimate of additional value (\$100,000) covering both going value and good will, that is, both the permitted and the forbidden elements, and where the evidence likewise shows no means of estimating separately the value of the going concern, the reviewing court, on writ of error, has no alternative except to leave out this element of value entirely for lack of proof. Upon its own statement of the state of the record, the state court was clearly right; no other disposition of the matter was possible. And likewise, upon the review by the Supreme Court of the United States, if their examination of the record confirmed the state court's statement of its purport, nothing but an affirmance was possible. Upon well-settled principles as to the binding effect of decisions, this is all that this case stands for, whatever the language in which the

judgment of the Supreme Court was couched. I quote from Mr. Justice Holmes' opinion, speaking for the court, as follows (223 U. S. 669):

"It would require a very clear case to warrant the reversal of the decree of a state court, which, though final in form, merely postpones a decision upon the merits for further experience. The present one is far from being such a case. * * * Then again, although it is argued that the court excluded going value, the court expressly took into account the fact that the plan was in successful operation. What it excluded was the good will or advantage incident to the possession of a monopoly, so far as that might be supposed to give the plaintiff the power to charge more than a reasonable price. (*Willcox v. Consolidated Gas Co.*, 212 U. S. 19, 52.) An adjustment of this sort under a power to regulate rates has to steer between Scylla and Charybdis. On the one side, if the franchise is taken to mean that the most profitable return that could be got, free from competition, is protected by the 14th Amendment, then the power to regulate is null. On the other hand, if the power to regulate withdraws the protection of the Amendment altogether, then the property is nought. This is not a matter of economic theory, but of fair interpretation of a bargain. Neither extreme can have been meant. A midway between them must be hit.

"In this case the court fixed a value on the plant that considerably exceeded its cost, and estimated that, under the ordinance, the return would be over 6 per cent. Its attitude was fair, and we do not feel called upon to follow the plaintiff [259] into a nice discussion of details. We perhaps should have adopted a rule as to depreciation somewhat more favorable to the plaintiff, or, it may be, might have allowed this or that item that the state court struck out, but there is nothing of which we can take notice in the case that could warrant us in changing the result, or in saying that the plaintiff did not get as much as it could expect when leave was reserved for it to try again."

Bearing in mind that this case was before the court on a writ of error, and also that the dismissal was without prejudice to a new suit after experience with the ordinance rates, we will correctly conclude that this decision does not, and indeed was not intended to announce any new principle, or any principle of general

application, but was merely a disposition of the case at bar. In so far as the opinion states that the state court allowed in the valuation for the going concern value, and only excluded good will from the estimate, it seems, with all respect, that this is a mistake, as I think has been shown. But if the opinion is correct upon this point, it means merely that the Supreme Court, on writ of error, will not find error, as a matter of law, in a valuation which is expressed as inclusive of the going concern element, though it fails to separately estimate the going value.

These conclusions appear to me very plain upon any thoughtful consideration of the case in question, if the student is aware of and bears in mind the rules governing the interpretation, as authoritative precedents, of judicial decisions. And yet Justice Holmes' opinion has been made the basis of a totally invalid extension of the decision, given currency by a well-known text-book (Whitten on Valuation of Public Service Corporations, p. 498), and offered by the city in this case. The contention is that the Cedar Rapids case decides that if the plant in question is valued by the method of reproduction cost, the valuation thus obtained necessarily recognizes the actual fact that the plant under appraisal is in successful operation and is therefore inclusive of the element of going value; for otherwise (and here is the [260] meat of the argument, and also the error in logic), if it were not in successful operation, the elements of property could be given only a dismemberment value, a scrap or salvage value. I have tried to show that the Cedar Rapids case supports no such rule. I have shown, by actual quotation, that the Omaha decision is explicitly to the contrary. It will also appear that the Des Moines Gas case, *infra*, in its statement of principles, is not in harmony with the suggested rule. And yet it is also true that the acceptance by the master in the Des Moines case of this interpretation of the Cedar Rapids case led to his failure to allow a going value which he considered to exist, and under the turn which the case took, to the affirmance of his decision by the Supreme Court.

I now discuss this Des Moines case, the latest decision of the Supreme Court, *Des Moines Gas Co. v. Des Moines*, 238 U. S. 153, decided June 14, 1915. It is necessary to extend this long discussion by referring to the language of the master's report. Unfortunately it has not been reported in full, and we must rely on the

extensive quotations in the opinion of the Supreme Court. Page references are to the latter report.*

From Justice Day's opinion and that of the District Court, it would appear that the master did not disclose a valuation by items but only by aggregates. It was stated by him as follows (238 U. S. 161, 199 Fed. 209):

[261] "Working capital	\$ 140,000
"Real estate	150,000
"Organization expenses	6,923
"Meters in stock	6,603
"Present value of physical property, aside from above items.....	1,937,402

"Total physical value.....\$2,240,928"

His method of determining the reasonable value of *structures* was by cost of reproduction new, fixed at \$1,975,026, without overhead, adding 15% for overhead costs—\$296,254, deducting depreciation—\$333,878, reaching thus the figure of \$1,937,402. (161, 162, 168.)

At page 166 *seq.* is quoted the master's comments upon the necessity of adding an allowance of overhead costs along with other construction costs, and his description of the items of overhead expense. I call attention to his language at pp. 167-8:

"It must be borne in mind that these *expenditures* are all made *during the promotion and construction* of the plant, and are necessarily a part of the cost thereof."
(Emphasis mine.)

The master was evidently under no illusion that overhead costs, occurring *during* construction, had any identity with or relation to the development costs, or the going value, which arise *afterwards*, during the operating period. This seems to be Mr. Justice Day's misapprehension.

Upon the question of going value, the master's position is thus disclosed in the Supreme Court opinion:

"After stating that he fixed the going value at \$300,000, he says:

NOTE.—A copy of the master's report has been received since this was written. It shows that the report was announced in draft form on March 10, 1912. The Cedar Rapids opinion was handed down March 11, 1912. There was re-argument on April 1st and 2nd, 1912, and the master's final report was dated April 4, 1912, and filed the next day. This brief consideration by him may explain what I conceive to be an erroneous interpretation of the Cedar Rapids case.

“It may be asked upon what basis this amount is determined. The evidence, followed strictly, might require me to make it higher, could my mind rest satisfied that the “going value” of this concern is worth more, but I cannot feel satisfied that such is the case, and regard \$300,000 as every dollar it is worth over and above its physical value, and in my judgment, it is worth that much more than a plant would be that had to develop its business. But that would be much more rapid, in my judgment, than is estimated. I think a purchaser would be willing to add this amount for its developed business, and [262] that a seller would not be willing to sell unless he got that much more than its physical value, but I could not give the mental process by which this conclusion is reached, any more than a jury could do so, under like circumstances, but it is nevertheless my judgment under all the evidence in the case.’ ” (163.)

The master then pointed out that “good will” was not to be valued, but that going value was something different; and concludes:

“There is no question that such a plant has a going value, because it is a money maker from the start. The only difficulty is to determine how much its ‘going value’ is worth. No interest during its construction is allowed, nor anything that is included in the ‘overhead charges,’ which are part of the physical value. But simply the fact that it has a developed business that will make money for its owner, with reasonable rates allowed for the product which it makes and sells.”

The sum of \$300,000, thus fixed as a separate and additional allowance for going value, may be noted to be 13.4% of \$2,240,000, total present value of physical property. The report thus far bears evidence of having been written in this form when the Cedar Rapids decision of March 11, 1912, was handed down. Its effect may be described in the language of Mr. Justice Day (p. 170):

“As we have already said, the master, while at first disposed to allow the additional sum of \$300,000 for ‘going value’ as a separate item, after the decision of this court in the Cedar Rapids Case *seems* to have reached a different conclusion, for he said of that case:

“* * * it also renders it extremely doubtful that “going value” will be included in the basis of return, beyond the fact that it is in “successful operation.” That

would exclude the sum of \$300,000 estimated in this case, on the grounds that when the ordinance was enacted, it already possessed a well-developed and paying business.

“In my judgment, after considering the able and thorough arguments of counsel, that (*sic*) it is decisive of the question, and holds that “going value” should not be considered in determining the basis upon which the complainant is entitled to have its return reckoned, and feel that it is my duty to so state.

“The physical value as hereinbefore determined, is reckoned upon the fact that the plant was in “successful operation” when the ordinance was enacted, otherwise its value would be much less. The “going value” is that enhancement which results from a well developed and paying business. This would result in reducing the estimated deficit for each year \$24,000, and yield a return to the complainant of, at least, 6 per cent on \$2,100,000.

“While this case is close to the border line, I cannot [263] say on the whole case that the evidence beyond any just and fair doubt, satisfies me that the rates will prove confiscatory, should the ordinance be put into effect and an actual test thereof be made.’ ”

It is unfortunate that the entire report is not available; for in what is quoted there is evident vagueness in the statement of reasons and in the figures quoted. As to the figures of reduction in deficit, \$24,000, this would be the interest on \$300,000 at 8 per cent, the rate contended for by the complainant (238 U. S. 156). The difference between \$2,100,000, which *seems* to be the final valuation, and \$2,240,928, the first statement by the master of the “total physical value”, is not made clear in the report as quoted, but is ascribed by Mr. Justice Day (p. 162) to the deduction from the first valuation of \$140,000, reproduction cost of paving over the mains, not existing when the mains were actually laid, a deduction approved by both the reviewing courts. The reasons given by the master for his change of view and final omission of the going value element are rather vaguely expressed but seem plainly-founded on the misapprehension of the Cedar Rapids decision which I have referred to, viz., the extension of that decision, that reproduction cost must include going value since the only alternative is the scrap value of a dismembered plant. I shall point out the fallacy involved later.

The master seems to have been unusually unfortunate in making

himself clear, in that his report was misunderstood by both the reviewing courts in two different matters—by the District Court as to his inclusion of going value in his “physical value”, and by the Supreme Court in respect to the costs covered by the overhead additions.

I quote first from Judge McPherson’s opinion in 199 Fed. 208-09:

“The master finds that the ‘going concern’ value of the plant is \$300,000; but the gas company, by its exceptions, contends that this sum is not in the total of items making \$2,240,928, the value placed on the entire plant. * * *

[264] The authorities already cited, and which in my opinion are in accord with good sense, favor the allowance of a ‘going value’. Every kind of business, with no exception, has a value known as ‘going value’, and such ‘going value’ is in no way connected with the monopoly or ‘good will’ value. The gas company contends that this ‘going value’ of \$300,000 was erroneously omitted by the master in his totals, while the city contends that the sum of \$300,000 has already been considered in making up the grand total of \$2,240,928. I am of the opinion that the contention of the city is a correct one. * * * The master fixes the physical value at \$2,240,928. He means thereby, and to my mind clearly states that as, the value of the *gas plant*. There are but five items making this grand total. Counsel on both sides and I agree that ‘going value’ is a part of the present value. The master so held. It would be strange that the master would hold that the ‘going value’ of \$300,000 entered into the actual value, and then by inadvertence omit it. And it would be the more strange after considering the items set forth in the report. By the report he lists the following:

- | | |
|--|-----------|
| “1. Working capital | \$140,000 |
| “2. Real Estate | 150,000 |
| “3. Organization expenses | 6,923 |
| “4. Meters in stock..... | 6,603 |
| “5. Present value of physical property,
aside from above items..... | 1,937,402 |

“Evidently, because the master used the word *physical*, counsel seem to conclude that he did not include ‘going value.’ If he had omitted the word ‘physical’ as an identification, then no one would doubt that he did include ‘going value.’ But why should the master include five

items, and omit one that he meant to include? But the criticism is too refined and technical to stand as against his entire report. After enumerating the four items, he adds, 'Present value of physical property *aside from* above items, \$1,937,402.' This is as though he had said, 'all other items of value to be considered.' How can it be said that he meant 'junk value'? Or 'bare-bones' value, as used in some of the cases? It is not fair to say that he meant junk value, or bare-bones value. He meant that was the value coupled with the preceding items of the gas plant—a plant making and selling gas. He meant that, and neither more nor less than that."

The report was accordingly approved, and the bill dismissed. Not only did the district judge fail to understand from what the master said that he had changed his first intention to allow a value for the going concern, as Justice Day demonstrates, but he also failed to appreciate the reasoning by which the master was actuated in so doing. And, furthermore, I think it will appear that this reasoning was not apparent to the Supreme Court.

I have already quoted from the Supreme Court opinion so far as it contains the master's report. After quoting the report as [265] above as to values of plant and of the going concern, estimated separately, Mr. Justice Day says at page 164 and following:

"That 'good will,' in the sense in which that term is generally used as indicating that element of value which inheres in the fixed and favorable consideration of customers, arising from an established and well-known and well-conducted business, has no place in the fixing of valuation for the purpose of rate-making of public service corporations of this character, was established in *Willcox v. Consolidated Gas Co.*, 212 U. S. 19, 52. 'Going value,' or 'going concern value,' *i. e.*, the value which inheres in a plant where its business is established, as distinguished from one which has yet to establish its business has been the subject of much discussion in rate-making cases before the courts and commissions. * * * That there is an element of value in an assembled and established plant, doing business and earning money, over one not thus advanced, is self-evident. This element of value is a property right, and should be considered in determining the value of the property, upon which the owner has a right to make a fair return when the same is privately owned although dedicated to public use. Each case must be controlled by

its own circumstances, and the actual question here is: 'In view of the facts found, and the method of valuation used by him, did the master sufficiently include this element in determining the value of the property of this company for rate-making purposes?' "

This statement of principles is of fundamental importance. It applies the rule in the Omaha Water case and the Kansas City case, applied there in cases of purchase, to the class of rate-fixing cases, a point rendered doubtful in the Omaha case in the last sentence of the quotation I have made above. It declares that while good will is not to be considered, going value is something different; that it is a "self-evident" element of value, and a property right to be considered and allowed in the valuation of the entire property upon which the fair return must, under the constitution, be allowed. But no formula for estimating the going value is prescribed, and it may readily be implied that that value may either be taken care of by separate estimation, or included in the finding certified by the proper tribunal as the aggregate value of the property as it stands. The decision declares that the review of each case brought before the Supreme Court must be controlled by its own circumstances.

The opinion then refers (165) to one of the methods or [266] yard-sticks by which a judgment as to the going value is formed, viz., the estimation of *actual* early deficits in the history of the plant, incurred while organizing and establishing the business—often referred to as "development expenses". In such an estimate of historical fact, Judge Day says, the company must show that it had not in the past been reimbursed by favorable rates, and that this proof was wanting.

The court then said (166):

"These items of expense in development are often called overhead charges, for which, as we have already seen, the master allowed fifteen per cent. upon the base value (exclusive of real estate), or \$296,254, in addition to his allowance of \$6,923 for organization expenses."

There is no disrespect to the highest tribunal in saying that there is here a very evident misapprehension as to the distinction which is *usually* made between the terms "overhead charges" and "development expenses", and, *semble*, which the master actually intended in the instant case. Overhead charges are, for example, moneys paid engineers, clerks, bankers, etc., *during the construction period* and *before* operation has begun; development expenses are

the expenses and deficits that attend the acquisition of business *after* construction is completed and *during* the period of operation. And it would seem that the master used "overhead" in this sense, for after describing the character of expenses that arise during the construction period other than the direct costs of specific work, he says: "It must be borne in mind that these expenditures are all made during the promotion and construction of the plant, and are necessarily a part of the cost thereof." The master does not refer to "development expenses" in the portions of his discussion quoted.

Justice Day next quoted from the Knoxville and the Cedar Rapids cases, without comment, and then quoted the final conclusions of the master already set forth above. I repeat a portion of the master's conclusion:

[267] "The physical value as hereinbefore determined, is reckoned upon the fact that the plant was in 'successful operation' when the ordinance was adopted, otherwise its value would be much less."

The reviewing tribunal necessarily took him at his word. Justice Day said (171):

"While there is a difference between court and counsel as to what the master meant by this, we think that it is apparent that he meant to say that, applying the rule of the Cedar Rapids Case, he had already valued the property in the estimate of what he called its physical value, upon the basis of a plant in actual and successful operation; for he said that otherwise its value would be much less.

"As pointed out in the Cedar Rapids Case, if return is to be regarded beyond that compensation which a public service corporation is entitled to earn upon the fair value of its property, the right to regulate is of no moment, and income to which the corporation is not entitled would become the basis of valuation in determining the rights of the public. When, as here, a long-established and successful plant of this character is valued for rate-making purposes, *and the value fixed as the master certifies upon the basis of a plant in successful operation*, and overhead charges have been allowed for the items and in the sums already stated, it cannot be said, in view of the facts in this case, that the element of going value has not been given the consideration it deserves and the appellant's contention in this behalf is not sustained." (Emphasis mine.)

The case really turns upon the effect of a master's certification of facts, which is that it has the effect of a special finding of a jury. To parallel the case under discussion, if I should certify that the value of the plaintiff's plant, estimated largely by the aid of reproduction methods, was, in 1913, \$35,600,000, and that in that estimate I considered and included a going concern value, it is difficult to see how any reviewing court would find any basis for modifying that finding, unless all my reasoning processes were set forth so that the factors therein could be seen, and possible errors discovered. From this standpoint, the court's additional reference to the allowance of overhead would be surplusage; and, indeed, I submit with due deference, it is an unnecessary addition to the reasoning, and unfortunate because of the confusion which it has caused. Using the term "overhead" with the connotations expressed earlier in this report, without promotion [268] charges or expenses of developing business after starting operations, I cannot believe that the Supreme Court intended to declare a rule that given the fact that the plant under appraisal is in fact a going concern (as would always be true), the valuation of that plant by reproduction cost plus overhead costs less accrued depreciation, automatically takes care of the going concern element of value. Such a rule would reverse the Omaha Water case and contradict the Supreme Court's statement of principles earlier in the present decision. If, however, we have a case where overhead charges as allowed included promotion, ordinary overhead *and development expenses* during operation, as Justice Day understood the term "overhead", then it would be possible to say that the Des Moines case is an authority in behalf of the proposition that, when reproduction methods are also used for direct costs, and the final appraisal certified as being that of a going plant, the going value has been sufficiently recognized. But that is not the situation in the cases at bar.

There is nothing in the Des Moines decision to indicate that the court apprehended the precise reasoning which induced the master to change his mind; and, considering the vague language of the report, this is not surprising. I have said that I suspected that it was the fallacious extension of the rule announced in the Cedar Rapids case. Judge Holmes there said in effect that the court might take into account generally in its valuation the fact that the plant was in successful operation. The argument is therefore made that a valuation of an existing operating plant by reproduction

cost (and it would apply equally well to a valuation by *actual* cost) must reflect in itself and take into account the going value; since the alternative is to assume that it is not a going plant and therefore only worth its scrap value. The apparent dilemma thus presented has persuasive force, and I believe convinced the master in the Des Moines case. I have myself in at [269] least one report accepted it. The fallacy can be demonstrated. The argument assumes that the property under valuation is either to be valued as a successful operating property, or an unsuccessful or moribund one. The enumeration of possibilities is not complete. In the mental process of obtaining present value by reproducing the plant there are three, and not two, conceivable aspects:

1. A plant whose market allows it no possibility of adequate earning power, one therefore that ought not to have been built; obviously of little worth, equaling neither actual nor reproduction cost, and possibly only of junk or dismemberment value. This is the only case I can conceive where such a value would obtain. Such a plant, however, is an abnormal one, to which the ordinary principles of value cannot be applied.

2. The plant established, and with its business developed, worth, as the Supreme Court has repeatedly held, more than the bare bones of its reproduction cost; the *normal plant* started and well under way. The third stage is intermediate between these extremes.

3. The plant completed, without business, *but with the potentiality of business in the future*; in other words, this is the normal plant at the close of the construction period and the beginning of the operating period. Such a plant is plainly worth at least the money that has been put into it, both direct and overhead costs. This is the point at which we have arrived in this case (with depreciation also deducted), and is the point where the method of ascertaining value by reproduction cost is always applied, lacking, obviously, any addition due to, or any consideration of, the value which comes from the going concern element, arising later as the result of successful operation.

The suggested dilemma does not exist. The master in the Des Moines case should have borne in mind only plants 2 and 3 above, neglecting the abnormal case of plant 1; and since his task was to value plant 2, he certainly would not have said that the plant [270] in successful operation was worth no more than the plant just starting, *both* being worth at least their reproduction cost.

The defendant cites *Contra Costa Water Co. vs. Oakland*, 159 Cal. 323, 341, which is apparently the only case where the matter has come before the state Supreme Court. The omission of a going concern value was there approved because of absence of satisfactory proofs. But in so doing, Mr. Justice Angellotti said:

“It is unnecessary to say that the burden was on plaintiff to furnish data showing that these elements had a distinct independent productive value before any such value could be included.”

The language must be considered too broad. It would lead in all cases to a rejection of any going value. For a distinct independent productive value can be assigned to the element of going value with no greater success than it can to a mile of main pipe or to any other item in the plant. The works have value as an organic whole. If the going concern element is from the necessities of a careful appraisal, with no concealment of mental processes, valued at a separate amount, it is not because it has value in isolation, but because it is, as the Supreme Court in the Omaha Water case described it, an element “contributing to the value of each tangible part of the whole”.

It is not necessary to go further into the state reports. We are, I think, in a position to summarize the results of the authorities. There seems no necessity for adding any independent discussion or opinion of my own, further than to say that it seems “self-evident”, as the Supreme Court says, that a normal going plant in successful operation, is, on any possible economic theory, worth more than its reproduction cost less depreciation.

The authorities cited warrant the following summary of the law as to going value in rate-fixing cases:

1. “Going value” or “going concern value” is the value that inheres in a plant where its business is established, as distinguished [271] from one which has yet to establish its business. (*Des Moines Gas case*.)

2. The fair value of a going concern is in excess of the cost of reproduction of its physical elements. (*Kansas City case*, *Omaha Water case*.)

3. In a rate case “good will” will not be considered in the appraisal where a monopoly of supply exists; but the element of “going value” is distinct and independent of “good will”, or of

a franchise. (Omaha Water case, Cedar Rapids Gas case [120 N. W.], Des Moines Gas case [199 Fed.], same [238 U. S.])

4. The "going value", as an element contributing to the value of each tangible part, may for convenience of estimation be appraised separately (Omaha Water case); or may be considered and allowed for in an aggregated valuation of all the property, viewed as a going concern. (Cedar Rapids case [*semble*], Des Moines Gas case.)

5. This element of value is a property right, protected by the 14th Amendment, and therefore entitled to be considered as part of the property entitled to earn a fair return for its use in the public service; and in this regard there is no distinction between rate cases and condemnation or purchase cases. (Des Moines Gas case.)

There seems to be here a clear mandate to find, if possible under the evidence, an additional item of value, applicable to the entire property, to cover the "going concern" element. Here, as throughout the case, the presumption in favor of the validity of the legislation and the requirement of convincing proofs on the part of plaintiff, must be held in mind, and with special attention because of the inherent difficulty of estimating intangible values as compared with the values of physical properties in isolation. On the one hand, we must bear in mind that such intangible elements [272] often possess large values and have been judicially estimated in large amounts, even in millions of dollars; and courts and legislative bodies must have courage to so find, if the proof warrants. And further, precision of estimation or mathematical demonstration cannot be required, since in the nature of the case it is impossible; but the requirement of "clear proof" does not require such a demonstration, but only that degree of reasonable indication of value as would convince an honest judgment. On the other hand, there is great danger that the proofs may rest on impossible theories and result in extravagant inflations of value. If the evidence does not clearly compel the judgment, the result must be that the going value, though admitted to exist, must be denied for lack of proofs of its amount. It will be helpful, I think, to regard the situation throughout as if it were a transaction of purchase and sale between willing parties, to estimate the effect of the evidence upon such negotiators, and to endeavor to approximate the result of their bargaining.

We may now examine the evidence,—resume our voyage be-

tween Scylla and Charybdis, after this examination of the charted course.

The city presented no evidence of value, since it denied, on points of law, any value in addition to that reflected in the appraisal already presented. All the city's points have been denied explicitly or implicitly, in the decisions which have been reviewed. Mr. Dillman's theory that it depended upon the state's liberality is subversive of the conception of going value as a right of property, and might readily be extended so that, as Justice Holmes said, the entire property "would be nought." That valuation by the method of reproduction cost less depreciation must inevitably include the going value, another argument of the city, has been disapproved in express terms. The final argument is that the city's existence, and the consequent values that the plaintiff's physical properties now have, are inextricably dependent and consequent [273] upon the fact that plaintiff's plant has always existed, and therefore no method of estimation in the way of reproducing the plant and its business is logically to be entertained. The error here seems in part that covered by the last point; but the answer seems to be that if this water company had not existed, some other company would inevitably have been in operation, which would have had a going value. The problem of estimating that value simply undergoes a mental transfer to another company.

The evidence upon this question was presented by Leonard Metcalf, and, in brief reference, also by Allen Hazen. Mr. Metcalf was well fitted for the task. He has studied and written extensively on the subject in technical journals, and has participated in appraisals and in many sales of going plants. His testimony, as embodied in Exhibit 198 and in the record, shows not only an immense amount of labor in assembling materials for a judgment of value, but a very evident desire on the part of the witness to exercise that judgment fairly and conservatively. This must be acknowledged whether we agree with his final opinion or not. I doubt if I could abridge the testimony in any adequate way; the court should read the evidence on this point to obtain a clear understanding.

The witness first considers certain rule-of-thumb methods. These are empirical formulae derived in part from actual valuations for sales or other purposes, and in fact, we may infer, by way of approximate short-cut from the results of more elaborate computations by other methods. (See 10238-9.)

The first of these mentioned by the witness is that which values the going value element as a per cent of *gross* reproduction cost. This, he says, in the case of waterworks, "generally lies between 10% and 15% of the gross reproduction cost of the property, sometimes reaching upwards of 20%, rarely being less than 10%." (10238.) Metcalf's gross reproduction cost estimate of this property, including overhead and interest on lands, is, for 1913, [274] about \$47,000,000; his "fair value" or rating base, \$43,500,000. At 10%, the going value indicated would be \$4,700,000, or \$4,350,000. My figures, for 1913, for gross reproduction cost of structures are \$22,000,000 in round figures, and for lands, rights and other items, *without* overhead, about \$16,400,00, or a total in round figures of \$38,400,000; and taking net reproduction cost subtracting depreciation, \$35,600,000. At 10%, the indication for going value would be \$3,840,000 or \$3,560,000.

The second rule-of-thumb method referred to by the witness is expressed in terms of gross annual revenue. I quote the witness:

"In terms of gross annual revenue, development expense is found to be approximately equal to one year's gross annual revenue, as of the date of valuation, in the case of ordinary waterworks properties of medium and small size, and between 1 and 1¼ times the gross annual revenue in the case of the larger properties,—the cumulative interest-during-construction charges incident to the long period of construction involved in the building of the larger works being accountable for the difference." (10242.)

Metcalf gives the actual gross revenue collected for the calendar year 1913 as \$3,361,969; the revenue the ordinance would have produced, about \$3,000,000. These, then, would be indications of the going value according to this formula at its lowest percentage.

Obviously, such empirical formulae do not bear on the face of them any justification in reason for employing them; nor is there suggested any principle underlying them. The city thinks they should be entirely excluded from consideration for this reason. And furthermore, we may imagine cases where the two empirical methods would not only be radically out of harmony with the results of other methods, but equally with each other. For example, a natural gas well might require small capital in plant, while its product in competition with manufactured gas might com-

mand a large revenue; the two rule-of-thumb methods would then produce discordant results. But this only means that the rules are [275] derived from normal cases, and that they are only approximate guides, to be used as aids to judgment in a common-sense way. The city's position fails to meet the suggestion that if appraisals and actual transactions of sale are either influenced by such formulae, or disclose the results therein embodied, the empirical character of the methods is not a reason for rejecting them. I believe they should be taken into consideration as aids to and checks upon judgment, in connection with all other possible methods of appraisal.

Metcalf then considers what he calls "Development Expense Under Past or Historic Conditions," as embodied in the method applied by the Wisconsin Railroad Commission. This method is as follows: To the original cost of the property upon completion, there is added each year the new construction during the year, together with overhead and incidental costs, all operating expenses, an allowance for fair rate of return, based not on cost of borrowed money, but such as to include the investor's profit. From this sum is deducted the actual gross revenue for the year. Annually thereafter a similar course is pursued, there being added each year to the capital sum, the difference between the actual revenue earned, and the sum of the operating expenses, including repairs and taxes, the depreciation allowance and a fair return on the previous capital sum,—the sum of the deficits in earnings below the assumed fair rate of return thus constituting the development expense, any *excess* earnings resulting from this process being thus deducted and serving to reduce the development cost to date of appraisal (p. 10243). As thus far described, the method is a computation of actual losses based on actual costs of the property. Obviously, it could only be used in connection with an appraisal of the property on the original cost basis, which, as we have seen, is inapplicable where property values have changed. To meet this, the Wisconsin Commission adds annually or periodically to the *cost* of the property any appreciation in value that may have occurred. [276] (10244). In applying this method to the historical development of the Spring Valley properties, Metcalf took the original cost records, excluding all expenditures in the nature of overhead costs, the record of which was fragmentary, excluded all interest except six months' interest-during-construction, allowed 2% annual appreciation upon costs of *lands*, and an

annual depreciation allowance of 1.45% of existing structures on the sinking fund basis, and deducted from the cumulative original costs the amount of abandoned or never-used lands and structures. In figuring fair return annually Metcalf used the actual rates at which the company in the past had borrowed money, the money-lender's rate and not the investor's rate, which would be higher. The application of the method is clearly shown in Table 9 of Exhibit 198, which is too extended to reproduce here.

Upon these assumptions, the appreciation upon the lands in use from 1865 to 1913 was \$4,628,000 (their cumulative cost being \$8,051,581); the cumulative investment or capital sum on December 31, 1913, \$36,830,561; the computed revenue for the year ending December 31, 1913, \$3,656,000 (the actual revenue, including impounded money, having been \$3,368,697, or about 10% less); and the cumulative deficiency in receipts, or so-called Development Expense, \$5,953,000 on December 31, 1913.

Upon the whole, Metcalf's assumptions seem fair. He has added no appreciation to structures, though costs have undoubtedly increased. His figure of 2% average appreciation on lands gives him a total of \$12,600,000 as compared with my findings of \$12,900,000; of course, land does not usually appreciate at a constant ratio, but at least the average seems fair. His depreciation rate is somewhat higher, apparently, than would produce the existing depreciation as I have found it. His assumed fair rate of return is perhaps lower than he would have been warranted in using; certainly we may say it is conservative. If, during the period 1907-13, he had taken the receipts under the ordinance rates, the revenue actually received, instead of, as he did, the revenue as charged, [277] including the 15% impounded in this court, the development expense or cumulative deficiency in fair return would have amounted to over \$2,000,000 more than the \$5,953,000 which he attained. I conclude that, on the whole, the table presents a fair calculation of the results under this method.

The table presents some interesting features. It shows each year a deficiency in receipts from 1865 to 1878, then an excess of receipts beginning 1879, gradually increasing to about 1884, continuing fairly steady with continued large revenues to about 1898, then decreasing rapidly, presumably by reductions in rates, until in 1903 a deficit again appears, which has grown to the calculated proportions, \$5,953,000, largely during the period involved in these suits, and those tried by Judge Farrington. There is thus

illustrated very clearly an inherent defect in any "development expense" method, based on past history. For during the period when the company was most prosperous, it was by this theory worth the least—with no value or a negative value to the developed business; and during the early formative period and the more recent period of lowered earnings, it was worth the most. Obviously, such results are opposed to all economic theories of value. If, however, the remarks of the Supreme Court in the Des Moines case previously quoted (238 U. S. 165-166), are considered to look with favor on the development expense method, then I must take this uncontradicted testimony of Metcalf as a guide to such finding as may commend itself to my judgment. The city does not urge this method as one prescribed by the decisions.

Metcalf himself attaches little importance to this method, though it exceeds considerably the amount of \$3,400,000 which he finally reached; his reason being that in any very old plant like this, the effect of compounding interest, involved in the method, would greatly magnify any error that may have occurred in the computations [278] for the earlier years. (10256, 10259-60.) He points out (10269), it would seem with logical correctness, that a method of ascertaining development expense under past or historic conditions is to be associated logically, not with valuation by reproduction cost, but with the method of valuation by original costs, which the courts now uniformly reject except for recently-built plants.

The witness then considers the method which he calls that of development expense under *present* conditions, or cost of reproducing the business by the so-called comparative plant method. (10269 *seq.*) It determines the *value* of the business, the existing created income, of the going concern under appraisal, by hypothetically reconstructing the *cost*, at present, of creating that business, just as the reproduction method applied to the valuation of structures determines that value by the cost of presently constructing them. It is, in effect, a projection of the hypothetized reproduction of the existing property beyond the construction period into the operating period. It will be recalled that I have assumed and allowed, in my valuation of structures, estimates of cost, particularly interest-during-construction, to the dates of completion of successive portions of the waterworks system; these portions, adapted to serve portions of the city, are now conceived to go into operation, earning income and incurring operating expense. That situation will continue, with inevitable deficits, until the entire

plant is finished. In a former report in the Pacific Gas & Electric Company's case, I expressed the opinion that the calculation should end there; that we must assume, according to the actual fact, that all the consumers are ready and waiting for the water to be turned on. Upon consideration, I am convinced that this view merely allows an additional amount of interest-during-construction, and, by its assumption of the consumers' readiness, ignores the existing fact that the plaintiff [279] possesses that established business, and in effect begs the question of its value. (See 10306, and generally 10302, 10311.) We must, therefore, go forward during the operating period with an estimate of earnings, expenses and deficits until the reproduced plant has acquired the business and displaced the existing plant. This Metcalf has done. "Under this method of treatment," he says (10269),

"the development expense is equal to the difference between the sum of the present worths of the net revenues of the existing property and of the new or comparative plant during the period of years assumed to be necessary for the new plant to develop business to the level of the existing plant."

We may visualize the method by assuming an investor contemplating the purchase of the plaintiff's plant in 1913. His alternative may be assumed to be, on the one hand, to buy the existing plant with its established business, or to build a new hypothetical plant which will replace it and acquire its business under non-competitive conditions. The assumption of replacement of the old by the comparative plant is obviously necessary to attain the end sought; and, likewise, absence of competition is a necessary condition, to conform to the actual fact and to avoid inflating the development expense by the added deficits of competition. Perhaps it would be easier to conceive his alternative as one between the existing going plant serving San Francisco, and the opportunity of installing a new plant of like physical cost and potential earnings in another community, which at the time was inadequately served, or only partially educated to a modern water-supply, as was New Orleans a few years ago. He could then afford to pay for plaintiff's established business the present worth of the deficits that he would incur in getting a paying business in the alternative community, at the risk of his private capital.

The application of the method involves an estimate of the time necessary to conceive and construct the new plant, and acquire the

[280] present business, the proportion each year in which revenue will be collected, and the operating expenses of each year. How this may be done is illustrated in Metcalf's testimony and in Exhibit 198.

The criticism will at once occur to us that this involves a considerable amount of hypothetical assumption; and this is true. But there is nothing novel in such a state of things. The policy of state regulation of rates is an attempt to control by law the play of natural economic forces, and an artificial situation is inevitably produced. The natural criterion of value is earning power under the law of supply and demand; but this test of value we deprive ourselves of by enacting the rate of earnings. To determine value, then, we have turned to other standards, all, more or less, involving assumptions that are not self-probative, whether these standards be actual costs, reproduction costs, or, as here, reproduction cost of developing business under present conditions. Hence the need of experienced and fair expert estimators. I cannot summarily describe Metcalf's processes in reaching his results; his testimony must be read. He draws on a wide experience with waterworks operation and an extensive knowledge of waterworks statistics; he instances cases of development of water business, and makes the adjustments necessary for the case in hand in a manner that seems to me conservative and fair. It is emphatically a method that has value only in the hands of an experienced and judicially-minded witness, and these requirements the witness meets in a very admirable way. The method seems to me a sound one, and the calculations made on a fair basis.

Tables 7 and 8, Exhibit 198, show the summarized computations of the going value on this method, on assumed fair value of plant of \$43,500,000 and \$35,000,000 respectively. On the former figure, his going value amounts to \$3,092,000 on an assumed [281] fair rate of return of 6%, and \$4,786,000 on a rate of 7%. On the figure of \$35,000,000, he reaches results of \$2,837,000 on the 6% assumed rate, and \$4,219,000 on the 7% rate. It will be observed that the figure of \$35,000,000 is almost the same as the amount previously reached in the master's appraisal.

The witness also computed development expense under operating conditions between 1907-15. This was upon request and without the witness' approval. (10286.) On a fair value of \$35,000,000 the results were \$2,156,000 and \$3,466,000 at the two rates named. (Table 8a.)

Mr. Metcalf also cites allowances for going value in a number of decisions of courts and commissions. These, with some others that have met my attention, I give below, omitting all commission rulings and some unreported valuations. The percentage rate is based upon the appraisal of physical property, less depreciation, and without any addition for the going value element.

	Physical property	Going value	Per cent.
<i>National Waterworks Co. v. Kansas City</i> , 62 Fed. 853	\$2,714,000	\$286,000	10.5
<i>Knoxville v. Knoxville Water Co.</i> (lower court), 212 U. S. 1	538,000 (undepreciated)	60,000	9.0
<i>Willcox v. Consolidated Gas Co.</i> , 212 U. S. 19.....	47,831,435	7,781,000 (franchises)	16.0
<i>Omaha v. Omaha Water Co.</i> , 218 U. S. 180.....	5,700,583	562,712	9.8
<i>Des Moines v. Des Moines Gas Co.</i> , 238 U. S. 163...	2,100,928 (omitting paving)	300,000 (master's first finding)	14.28
<i>Public Service Gas Co. v. Commissioners</i> (N.J. 1913), 87 Atl. 657-8.....	.....	1,025,000	30% of physical property
<i>Pioneer Tel. Co. v. Westenhaven</i> , 118 Pac. 354.....	94,663.69	18,932.73	20.0
<i>Gloucester Water Co. v. Gloucester</i> (Mass.), 60 N. E. 977	501,544.60	75,000	14.9
[282]	Physical property	Going value	Per cent.
<i>Galena Water Co. v. Galena</i> (Kas.), 87 Pac. 735.....	\$60,185.27	\$15,214.73 (inc. franchise)	25.28
<i>Newburyport Water Co.</i> case (Mass.), 47 N. E. 534	235,000	40,000	17.0
<i>Venner Co. v. Urbana Water Works</i> , 174 Fed. 348....	155,000	25,000	16.1
<i>Des Moines Water Co. v. Des Moines</i> , 192 Fed. 193	1,680,000	168,000	10.0
<i>Denver Union Water Co. v. Denver</i> (master), Oct., 1915	12,615,899	800,000	6.3
<i>Contra Costa Water Co. v. Oakland</i> (master), Oct., 1916	4,503,096	350,000	7.77

The Willcox case is included, though the valuation noted is of franchises, and under the facts peculiar to that case, for the sole reason of showing that the highest court will, on occasion, value an intangible element of property at very substantial sums. It may be noted that there is here no claim for value of the plaintiff's franchise, though it possesses a perpetual franchise under the State Constitution.

Finally, we have Mr. Metcalf's opinion evidence that there should be added to the appraisal the sum of \$3,400,000 to cover the going value. Metcalf's appraisal of physical properties otherwise is, in round figures, \$40,000,000, and his going value is 8.5% of that sum. While this opinion will be tested for its credibility largely by the reasons disclosed in support of it, partly indicated above, it has independent value of its own. Mr. Metcalf is an expert upon this subject, well equipped to advise the master, not only by broad study, but by contact with many transactions between parties, where the matter of going value was an element considered and acted upon. His position and authority in this respect and indeed his methods of reaching an opinion, are identical with those of the real estate appraisers, whose conclusions we have examined early in this report. His valuation is well supported, and I have before me no contrary opinion. The [283] city rests upon the proposition that no going value should be allowed under the process of appraisal which has been followed.

I turn now to what Hazen has to say. He has contributed a new idea to this subject, one that commends itself by its simplicity and common-sense appeal. One may assume that it has been appreciated and acted upon before by valuers, but to my knowledge it has not been mentioned in any decision or in the literature of the subject. There may be defects in it, but at present I see none; it seems to me, at this writing, a method for estimating a value for the going plant, treating it on broad lines, which deserves very careful consideration.

The idea thus contributed depends upon the premise—which I think indisputable—that, in any normal case, the rate of earning at which capital will be attracted to an enterprise differs as between an established business and one not so established, in which the risks have not been survived. The latter requires a higher return, has no going value, but is worth its cost. In other words, this is the point we have reached in the present appraisal; the plaintiff's plant was in December, 1913, worth \$35,600,000, in round numbers,

for physical elements alone without regard to its established position, in other words, viewed as a newly-started plant of that worth. If we determine the appropriate rate of earnings upon this capital, and from that the proper gross earnings, and then determine the appropriate rate which would attract capital to the property *as it is*, fully established, a capitalizing of the gross earnings at the lower rate will give the capital value of the established plant; and the difference between the two capital amounts will be the sum added in recognition of the going value.

I have attributed this suggestion to Hazen, but it would be more exact to say that it is my inference from his treatment of another matter. I refer to his determination of the rating base, or fair value of the property for rating purposes. In fixing this [284] at \$40,000,000 for 1913, Hazen accepted, for purposes of the estimate, appraisals by others of lands and water rights, but in this figure included nothing for certain elements of value—for example, this element of going value. So far as he suggested any method, it was to estimate it at one year's gross income. It seems to me worth while to quote what Hazen has to say on this question of the rating base, since he discusses going value incidentally, and discloses the thoughts which have suggested the last method of estimating it. He says (8328):

“The next business that is to be taken up is to get a rating base; by that I mean a certain amount on which rates are to be calculated. In reaching a figure to use in this way it is my intention to use a figure which is not necessarily or actually the value of the property. The method of making up the rating base is inseparably connected with the rate of return that is to be used in connection with it. It is possible to use a smaller base, excluding various items and in connection therewith to use a higher rate of return, or otherwise, to use a lower rate of return applied to the full value of the property, getting the same result in either case. A rate of return, as I look at it, is a rate sufficient to make the investment a reasonably attractive one to the investing public and to make it certain that money will be available to carry out an enterprise if it were to be undertaken. Looking at it from that standpoint there is not any fixed rule to be following in making up the rating base. If the whole value of the property is included in the rating base obviously the investor will be satisfied with a smaller rate of return. But if various

items of value are excluded and a smaller rating base is taken then a higher rate of return must be allowed to make the business equally attractive. * * *

(8331) "I feel that a plant in successful operation, which is a going concern, is more valuable than a plant without such business. As a part of the whole value of the plant for the purpose of sale, I should say that going value to the extent of one year's gross income certainly ought to be considered, but I have not included it in the rating base. It sometimes has been said that a plant was valued as a going plant when the cost of reproduction is estimated, but it does not seem to me that that follows. Take the case of a plant that has just been built for a new service; it has not any business and it has not any going value. It is certainly worth the cost of reproduction. The difference between the going plant and the plant that is not going is something that comes afterwards, and when it gets it it is an added value. To take the other view of it, if you follow it backwards, is to reach the conclusion that if the plant did not exist it would not pay to build one, which certainly is not true of the conditions in San Francisco or other American cities. * * *

(8416) "If the going value is taken as one year's gross income, it amounts to about 8% of the rating base, \$40,000,000. If 6% were a fair return on the whole property, then 8% of 6% or .48 of one per cent would be added to give an equivalent return with the going value excluded; and 6½% on a base excluding the going value would be needed to put the property in as attractive a position as 6% on the whole including the going [285] value. If 7% were fair on the whole value of the property, including the going concern value, then 7.58% would give an equivalent return on a rating base which excluded it. * * *

(8470) "It seems to me that the full value of the property of this company used in supplying water is more than \$40,000,000. I should say it must be worth in the neighborhood of \$45,000,000. * * * Going value represents, in my judgment, an undoubted element of value and a large element of value, but it is very difficult to estimate it in any close and satisfactory way. The difficulty in estimating it has been perhaps responsible more than anything else for the disposition to disregard it, because it cannot be accurately estimated. But it seems to me it does exist, and it has to be recognized. I am disposed to think that a fairer way of handling the matter is to exclude the

going value from the rating base, but in connection therewith to use a higher rate than would be used if it were included, and so to that extent the rating base is less than the full value of the property. * * * (8472) I should say that for the greater part of this property, perhaps for all of it, that a 7% rate of return on the \$40,000,000 base would give the company just compensation for the use of its property. * * * In a general way the fair rate is made up of what represents the interest on the money that would produce the plant, and a profit. A profit is necessary. The business will not go on without it. * * * Then there is the element of risk, which is to be considered and which is not sharply defined from either the interest or the profit. * * *

(8476) "When a business is established and going and earning a certain revenue, it is normally worth to the investor what that income amounts to, capitalized on a rate of return which practically is measured by the rate of return on other investments of equal security, and that rate of return is normally less than the amount which a company has to have the chance of earning, if it can, in order to induce capital to go into an enterprise of that kind; in other words if you want to build the Calaveras works, and you want people to put their money into the enterprise on a chance of earning some rate of return without any guarantee that they will earn it—simply on a chance—we have to make that chance 7%, we will say: Now, when the Calaveras works are built, and if the enterprise is successful and it earns that 7% on what it has cost, and is established, then the man on the street will capitalize that income at 6% and the plant is worth one-sixth more than it cost."

Let us apply the method thus suggested. We have the value of the property, excluding the element of going value, \$35,600,000 in round figures, in 1913. We must determine the difference between the rate appropriate for the going plant and a like plant ready to begin business. In discussing the question of rates of return, Mr. George K. Weeks, a thoroughly qualified witness, states the two rates at 7% and 8% respectively, as minimum figures. (9412-13, 9420-21.) Without passing now on the correctness of these rates, the difference in percentages, 1% seems fair. There is [286] no other evidence of which I am aware; Hazen's difference of about ½% (quoted *supra*) was predicated on an assumption of 8% of

physical value, at \$3,200,000, for the element of going value. We may, however, adopt a cut-and-try process, using various rates and differences, as a test of Metcalf's conclusions. Take for instance, 8% and 7%. Eight per cent of \$35,600,000, the value of these properties in 1913, excluding going value, gives a proper net income of \$2,848,000. Capitalized at 7% to get the value of the same plant with its going business as it is today, we obtain a figure of \$40,-685,714. The difference between the two capital sums, \$5,085,714, would represent the value of the going concern. I append the results on a number of percentages:

8% and 7%	\$5,085,714
7.5% and 6.5%	5,476,923
7% and 6%	5,933,333
7.25% and 6.5%	4,107,692
7% and 6.25%	4,272,000
7.5% and 7%	2,542,857
7% and 6.5%	2,738,461
6.5% and 6%	2,966,666

We have reached a point where a summary may be made. There is a mandate of law that a going plant has value over and above what that plant would be worth if it were just beginning operations; that such value must be allowed as part of the property upon which a fair return shall be made in the rates for service; and that, as a matter of method of appraisal, this element of value affecting each tangible part of the property, may be estimated separately, if the evidence clearly warrants the fixing of a definite amount. I have given the evidence long and very careful consideration, having special regard to the intangible character of such an element of property and the danger of over-estimate. It seems clear to me that Metcalf's appraisal [287] of \$3,400,000 for the year 1913-14 represents a conservative and just judgment, and I adopt it as my own.

In determining the amounts to be estimated for the other years, Metcalf adopts the ratio to gross earnings of each year which \$3,-400,000 bears to the gross earnings of 1913; as a result, the amount added is approximately the gross earnings of each year concerned in these suits. More elaborate computations for the other years do not seem to be warranted, and the method applied seems here to be entirely fair. Metcalf's allowances are shown in Exhibit 201.

Upon the evidence before me I find that there should be added

to the appraisal otherwise, in recognition of the going value of the plaintiff's plant in the years given below, the following amounts:

1907-08.....	\$1,900,000
1908-09.....	2,300,000
1909-10.....	2,700,000
1910-11.....	2,900,000
1911-12.....	3,000,000
1912-13.....	3,200,000
1913-14.....	3,400,000
1914-15.....	3,400,000

Summarized Appraisal of Property Used and Useful

Before considering from other points of view the question whether the appraised value of plaintiff's property as now accomplished shall stand as the value upon which a fair return should be estimated, it will be convenient to summarize the results obtained. In the second column of the table there is repeated the sum of the detailed appraisals of the physical properties, without consideration of the additional value of the plant as a going [288] concern; in the third column, the amount of that additional value; and in the last column, the value of the plant as it was in the years in question, a going concern with its business established:

1907-08.....	\$31,019,547	\$1,900,000	\$32,919,547
1908-09.....	31,123,228	2,300,000	33,423,228
1909-10.....	31,520,883	2,700,000	34,220,883
1910-11.....	32,237,765	2,900,000	35,137,765
1911-12.....	34,458,543	3,000,000	37,458,543
1912-13.....	35,192,305	3,200,000	38,392,305
1913-14.....	35,633,512	3,400,000	39,033,512
1914-15.....	35,613,242	3,400,000	39,013,242

FAIR VALUE—RATING BASE

We have seen that the governing rule in these rate-fixing controversies is that the company serving the public is entitled to receive, in net earnings, a fair return on the fair present value of the property devoted to that service. In this case, that "fair value" is conveniently described by the term "rating base." But it will be recalled that, as late as the Minnesota Rate Case, the Smyth-Ames rule has been approved that, in determining that fair value, all means of informing the judgment should be given con-

sideration—reproduction cost, original cost, market value of outstanding stocks and bonds, anything that may throw light on the problem. And we are also warned that the process of valuation is not a matter of formulas, that each case must be considered in the light of the surrounding circumstances, that the charge must be reasonable to both company and consumer. As I have said many times, all of this is essentially the statement, in varying forms, of the principle that the valuation must be of a normal plant, and the return must have reference to a normal cost of production.

[289] All of such considerations, except the rule of outstanding securities, have been given effect as the appraisal has proceeded. I am satisfied that the result represents the fair value. I advert briefly to the studies of cost, investment and securities issues.

As stated many times before, the only aid that cost studies ever give is when they are recent. The aggregate cost of an old plant like this can be no index to its present worth. Metcalf gives the following figures in Exhibit 201:

Original cost:

(a) Of entire property, including allowance for overhead and interest, but excluding allowance for abandoned property, for depreciation and for development expense (Plaintiff's Exhibit 170, table B-2 revised).....	\$34,629,000
(b) Of property now in use, excluding overhead and interest during construction (Plaintiff's Exhibit 170, table B-2 revised).....	25,424,000
(c) Same, with addition of estimated overhead (10% on structures and 2% on lands) and interest (8.88% on structures and 7.7% on lands). (Exhibit 170, table B-2).....	29,460,000
(d) Resulting, of property in use, with allowance for overhead, interest during construction, abandoned property, and depreciation, but excluding development expense. (Exhibit 170, B-2)	26,548,000
(e) Of entire property, less abandoned property and depreciation on existing property, including 2% annual appreciation allowance on lands and allowance for development expense based on rates corresponding to fair cost of money, without profit, to S. V. Water Co. (Exhibit 198, table 9) .	36,831,000

[290] Metcalf also gives (Exhibit 201) a computation of the total investment of bond- and stockholders, excluding the amount of any profits re-invested in the property, as follows:

(a) Without accounting deficits, without allowance for interest upon investments during year of investment (Plaintiff's Exhibit 12-BB).....	\$27,526,000
(b) Without accounting deficits; with six months' interest allowance upon investment during year of investment (Plaintiff's Exhibit 12-BB).....	28,657,000
(c) With allowance for deficit and excess in earnings below or above fair cost of money to S. V. Water Co. (Exhibit 12-CC).....	40,382,000

I leave these figures without further comment. Metcalf also computes for us a set of figures which under normal conditions might be expected to afford some aid, viz., the market value of outstanding bonds and shares of stock (Exhibit 200). The transactions were small sales, never a controlling interest. Metcalf attains his results by computing yearly averages.

The bonds are due in 1923, and carry 4% interest; they are recognized as a high grade security. The amount outstanding, par value, increased from \$17,859,000 in 1907, to \$23,101,000 in 1915 (including \$1,000,000 gold notes secured by bonds). The following shows the par value of bonds outstanding at the end of the year, the average sale price for the year, and the resulting value outstanding (approximate):

[291] 1907.....	\$17,859,000	87.11	\$15,550,000
1908.....	17,859,000	82.84	14,800,000
1909.....	18,773,000	89.31	16,760,000
1910.....	19,017,000	90.69	17,250,000
1911.....	20,987,000	92.06	19,320,000
1912.....	21,277,000	94.11	20,030,000
1913.....	21,277,000	91.04	19,380,000
1914.....	22,791,000	91.50	20,850,000
1915.....	23,101,000	92.94	21,470,000

The entire capital stock, \$28,000,000 par value, was outstanding during these years. The average sale price for the year and the resulting value of the stock (approximate), was as follows:

1907.....	21.28	\$ 5,960,000
1908.....	25.62	7,170,000
1909.....	35.58	9,960,000
1910.....	47.80	13,380,000

1911.....	55.34	15,500,000
1912.....	63.00	17,640,000
1913.....	55.96	15,670,000
1914.....	54.20	15,180,000
1915.....	52.65	14,740,000

The sums of these values for stocks and bonds outstanding are as follows:

1907.....	\$21,510,000
1908.....	21,970,000
1909.....	26,720,000
1910.....	30,630,000
1911.....	34,820,000
1912.....	37,670,000
1913.....	35,050,000
1914.....	36,030,000
1915.....	36,210,000

[292] The values which these securities represent cover not only the properties herein deemed in use, but also the properties excluded in this report, valued at \$2,871,248 (*supra*, p. 244), and other properties not appraised, not being considered in use by either party. This only emphasizes the disparity which is evident between these figures and those found in this report. But the securities' values upon the face of them have no correct relation to real values of this property, since a variation of \$15,000,000 as between 1907 and 1915 is not warranted by any facts in this record. There have evidently been extraneous causes affecting the values of the securities, and the evidence makes this plain. The bonds have been as steady as other bonds of the first grade. The considerations which affect market quotations of stock are first and principally, its earnings, or more immediately, its dividends, and secondly, the property values. For perhaps fifteen years there had been litigation with the city with respect to rates. The rates prescribed by ordinance for a number of years prior to the period under examination have been adjudged too low. At an early date, say about 1900, appeared the possibility of municipal competition from a source in the Sierras, which later took definite shape in the form of a bond issue in the sum of \$45,000,000 to build the Hetch Hetchy works, now being constructed. In later years, the city wisely abandoned the idea of competition in favor of the acquisition of portions of plaintiff's plant, deemed essential, by voluntary purchase or condemnation. Several propositions of purchase

were put before the voters at prices not shown by this record, and rejected. A condemnation suit was begun in 1913, and is still a matter for future decision. Litigation involving valuations for condemnation or rate-fixing is far more uncertain, expensive and protracted than litigation of ordinary kinds. The city has for years claimed a [293] just value for the properties to be between \$20,000,000 and \$25,000,000, for rating purposes. The company's balance sheets (Exhibit 174) showed capital assets for 1907 to 1911 of \$46,000,000 to \$48,000,000 and from 1912 forward, after appraisal by J. G. White and Company, a well-known engineering firm, assets of about \$65,000,000. In 1906 there occurred the great fire and earthquake, causing heavy losses to this company and disturbing market conditions; in 1907 a financial stringency, in 1914 the great war.

This recital is sufficient to indicate that the market for this company's stock, so far as it was guided by consideration of the value of plaintiff's property, was quite abnormal, uncertain and speculative in character.

The dividend history was likewise a depressing influence. (Exhibit 124, page 2; Exhibit 228.) The predecessor of plaintiff, the Spring Valley Water Works, had a capital stock outstanding of \$14,000,000 par value. When in 1903, at the end of its corporate life, the old company transferred its property to the Spring Valley Water Company, it received two shares of the new company for every one of the old company outstanding. This increase of capitalization is chiefly to be explained by the desire to increase the corporate debt, which by the law at that time could not exceed the capital. The dividends paid by plaintiff have been as follows:

1903	Oct., No. 1, @ \$21.....	\$ 58,800
1904	Jan.-Apr.-July, Nos. 2, 3, 4, @ \$.63, \$1.89.....	529,200
1905	“ “ “ “ 5, 6, 7, @ .63, 1.89.....	529,200
1906	Jan., No. 8, @ \$.63.....	176,400
1907	None	
1908	Dec., No. 9, @ \$1.00.....	280,000
1909	Mar., June, } Nos. 10, 11, 12, 13, @ .50 2.00.....	560,000
	Sept., Dec. }	
1910	do “ 14, 15, 16, 17, @ .50 2.00.....	560,000
1911	do “ 18, 19, 20, 21, @ .50 2.00.....	560,000
1912	do “ 22, 23, 24, 25, @ .50 2.00.....	560,000

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1913	Mar., June, Sept. Nos. 26, 27, 28 @ .50	
	Dec. No. 29, @ .625 2.125...	\$595,000
1914	Mar.-Dec. Nos. 30, 31, 32, 33, @ .625 2.50 ...	700,000

This shows that for nearly three years after the fire of 1906 no dividends were paid; in addition an assessment of \$3.00 per share was levied to replace fire losses. (Exhibit 174.) The abnormally low prices of the stock in 1907 and the following years were the result.

I find no particular value in these statistics of sales of securities. Neither party urged the importance of this data upon the argument. Obviously, if plaintiff had been able to pay out part or all of the revenues impounded in this court, as dividends, the stock would have responded to the stimulus, and greater aggregate security values shown. But it is hard to see how that would affect the issue before us.

Witnesses and counsel for both parties seem to lay some stress on the check afforded by the cost of supplying water from an alternative source, especially the Hetch-Hetchy source. A comparison with alternative or substitute sources seems to me useful in certain cases. To repeat what I have said early in this report: if two public-service companies are serving a community, *and both are necessary* to get the service done, the comparison of costs of production should be made, and the rate adjusted to the more expensive of the two costs, so that each might live. (See pages 8387 *seq.*) If both are not necessary, then probably competition will bring about normal economic conditions. Another conceivable use of the method would be with regard to extensions of sources of supply. If a company proposed to utilize reserve property owned by it, and it was clearly apparent that another source was available and was much cheaper, then it could well be argued that its duty to the public as well as to its stockholders required the utilization of the latter alternative. Another use of the comparative method is that which Hazen illustrates in his treatment of the [295] Merced source—the correction of local abnormality of value employed in the service at that point by comparison with the source owned by the company at Calaveras, now under construction.

But the use of estimates of the cost of a substitute supply from another source in comparison with the appraisal of the value of the plaintiff's whole property or its cost of service per million gallons daily, for the purpose of raising, lowering or corroborating the existing figures, has always seemed to me indefensible in theory and useless in attempted application. Theoretically, it seems unsound, because the existing privately-owned supply must be sup-

ported and given a just reward for its service to the public; it should not be either benefited or damaged by a purely hypothetical non-existent competition. If, as the plaintiff's witnesses contend, the cost of Hetch-Hetchy water in equivalent quantity would be double the cost of Spring Valley water, the city would properly object to a conclusion that it should now pay double what would properly support the service. The company makes no claim in this case to an increased valuation on this account. On the other hand, if, as Mr. O'Shaughnessy indicates, the Hetch-Hetchy supply, reasonably developed as to amount supplied, would cost less, it seems premature to penalize the existing service.

The practical objections to the use of a substitute or alternative plant are equally serious. It has been a monumental and very expensive task to make this appraisal. To make estimates for another or many other hypothetical waterworks would multiply the difficulty. And they would be only estimates, far less exact than when checked by the experience of an existing plant.

For these reasons, I regard all evidence of this character as useless and shall make no findings as to alternative sources, especially the tender subject of the Hetch-Hetchy supply. The court will wish, perhaps, a brief reference to the state of the [296] record. At page 8386, Hazen says that for similar quantities of water the cost of bringing the Hetch-Hetchy water to San Francisco will be "more than double" the cost of water from Calaveras, speaking not precisely but in general terms. "The fact," he says, "that a large supply of Tuolumne water might possibly be brought in at some future time at a lower cost per million gallons is not of significance because there is no market at remunerative rates for such a quantity at the present time."

With respect to the market around the Bay of San Francisco, he testified (8466) that the company serving the east-of-the-bay cities had reserve supplies which could be developed, and he assumed would be, at a fraction of the cost of an equivalent amount of Hetch-Hetchy water. As to the entire bay region, he thought the local supplies ought to be and probably would be used first; that "in another generation, or in two generations," a greater supply would be needed, and therefore the idea of blocking out a supply from the Sierras and holding it in reserve was wise, but that it would not be an element in the local market in this generation. (8467.)

Mr. O'Shaughnessy, city engineer, who is in charge of the

Hetch-Hetchy construction, gave these estimates (10510): for 60 million gallons daily, \$40,747,000; 120 M. G. D., \$48,747,000; 160 M. G. D., \$58,612,000. These estimates provide for delivery of the water to San Francisco at an elevation approximately equal to that of University Mound reservoir, 170 feet above the city base, and to be comparable to Hazen's figure, there would be added the capitalized cost of pumping more than half the water to Lake Honda, at 365 feet. They do not include the capitalized cost of maintaining the pipe-line. They do not include the interest-during-construction, estimated by the witness (10514) at \$6,380,000, \$7,100,000 and \$7,588,000 on the respective estimates. He omitted these in the belief that the electric power developed would more [297] than compensate for the interest. Of course, these figures, like Hazen's for Calaveras, do not include the distribution system. Mr. O'Shaughnessy explains (10758 *seq.*) that these estimates for various quantities are the costs to physically build the structures necessary for those quantities; that the 120 M. G. D. plant will naturally not be built if there is only a possible market for 60 M. G. D.; that in December, 1913, perhaps 60 M. G. D. could have been sold, and a market for 60 M. G. D. additional would have to be created. The testimony leaves one with the impression that the extent of the market for supplies of water additional to the existing supplies is problematical; and I recall no evidence as to when the city's officials expect to deliver the mountain water, or in what amounts, if, as they intend, the city shall acquire the Spring Valley property.

I shall refer briefly to another sort of tests, aimed, like the last, to determine the so-called "value of the service," viz., water rates in other cities. Such facts as these seem absolutely worthless on their face, and there is little evidence in this record and no argument to support the application of such criteria. Yet the court must take judicial notice of the fact that the ordinary citizen, unfamiliar with the principles governing such matters, usually gives such statistics weight.

The price of grain, for example, will be determined by considerations of demand and supply, at a particular point, say Chicago, and questions of cost of production will enter to a minor degree; variations of that price at other cities will differ by the cost of transportation. But water, or gas, or electricity cannot be thus distributed beyond a limited distance. The charges at different places for public service will vary with differing costs of lands

and structures necessary to do the work, differing quantities sold, differing costs of labor and materials, differing rates to command investment money or borrowed capital. This ought to be self-evident. We learn from the evidence that the collections for water [298] service per capita in San Francisco are about double those in cities in the Mississippi Valley and east thereof (8419). But that is their good fortune; that water cannot be brought here. Reference is also made to Los Angeles, though the rate is not given. (8419.) Hazen states that the municipal water department there is not self-supporting; about half the cost of the service is raised by water-rates, the balance by general taxation and assessments. In addition, most of the pipe in the distribution system has been paid for by assessment of abutting property owners. Los Angeles also is built upon abundant gravel deposits which store enough water for their present needs; and the aqueduct, built for future needs, had an easy route through cheap lands. San Francisco furnishes a contrast in both respects. Finally, to Hazen's reasons of difference, may be added the fact that the rates for a municipally-owned plant and one privately owned will necessarily differ. If San Francisco owned the plaintiff's works, and were operating it at no greater cost and with like efficiency, I should expect rates for water service, even if the system were self-supporting, to be less. For there would be no stockholders and so no dividends to pay; the entire cost of the plant would be represented by bonds, and in addition the rate of bond interest which the municipality could command would normally be less than a private corporation could hope for.

There is another sense in which the term "value of the service" is used, the comparison of the worth of the service with costs of other services and commodities. It is an economic law that in every exchange of commodities or services there will be found, and must exist, if commerce in that line is to continue, a margin of profit to the producer over the cost of what he sells, and at the same time a margin of benefit to the consumer over what he pays. If this margin in favor of the consumer does not exist, he will turn to substitutes where possible, and in such [299] case regulation of price may be effected without resort to statutory laws. For example, gas must compete with electricity, coal and oil. But there is no substitute for water; its value to the consumer can hardly be estimated. No other form of public service, whether of gas, or electricity or telephone, or even of transportation, is so essential and

therefore so valuable. But it is evident that this gets us nowhere as regards our specific problem. About all we can say is that in every householder's experience the water bills are moderate in comparison with the costs of other forms of public service under state regulation of price, especially when we consider the peculiar merit of the service rendered. We can get no further along this line of thought than to say that the rates should be such as to support the service, and that in regard to that service, especially in view of its value, the state cannot afford to be niggardly. Probably all will agree with Hazen's statement in this connection (8418) :

“From the consumers' standpoint the service is worth all that it costs; it is worth a great deal more than it costs because a good water supply contributes as much to the prosperity of a community as anything that can be mentioned; the cost of the water service is very moderate indeed, as compared with the cost of other public utilities, as compared with the cost of the telephone, for instance, or with lighting. The business will pay whatever is necessary to support it.”

It was perhaps partly in sequence to this thought that the rates must support the service, that Hazen pursued the line of study shown in his Exhibit 164. He presents there, not only for the period 1907-15, but, by way of estimated forecast, for the period 1916-27, his estimates of population, consumption, gross revenue (assuming the rates actually charged in the past, including the 15% above the ordinance rates), operating expenses and taxes, depreciation, net revenue, and capital additions. He takes into account the imperative necessity of bringing in the Calaveras water and of remedying the present underbuilt condition of the system. If Hazen's figures are correct, the water rates [300] charged have been insufficient and must be raised. I do not find it necessary to pass on this question of future conditions and future rates. It is undoubtedly true that as a practical matter of business and financial administration, rates cannot be predicated on contemporaneous conditions and for one or two years only; they must involve a consideration alike by the water company's officers and by the state's regulatory commission of conditions and of new construction to be met in the reasonably near future. What disposition is to be made of such matters is a question that is now before the Railroad Commission of this state; and it would be an unwarranted interference

with that body's authority for this court, except upon necessity arising from this litigation, to prescribe in advance how the commission should exercise its judgment. It is true, and the evidence was admitted in view of that possibility, that this court is entitled to consider here, whether the supervisors of San Francisco, on the eight occasions when they fixed water rates, gave the consideration which fair and reasonable men would have given to the conditions to be faced by a water company in the future. No one would say that the supervisors who fixed water rates in the spring of 1914 were bound to consider the great changes which have come about by reason of the great war; perhaps even those of the following year might, with reason, have failed to appreciate and to allow for them; and it should be said, in passing, that Hazen's figures made no allowance for the changes referred to. But it would be arguable, at least, that they should reasonably have made provision for the large capital additions attending the Calaveras development. As I have said, I have not found it necessary to consider such matters or, in general, to forecast the future. In other words, I have taken each year as it was, under these present conditions. The future was taken into consideration, inevitably, in determining the annual allowance for depreciation, and will doubtless have to be held in view, in a broad, general way, in considering the fair rate of return upon [301] the capital in use.

I have frequently in this report stated the equivalency of the terms "value for rate-fixing" and "value in exchange," as in condemnation or purchase. The use I have made of this idea, in the way of clarifying reasoning and of applying precedents, has doubtless appeared plainly. But to avoid misapprehension, it should be understood that the rating value for 1913, for example, is not deemed by me the sale or condemnation value for that year. If the city had purchased the plant then, and had taken over all the lands in the Merced ranch which I have included in the rating base, but with a deduction from sale value upon the principle of abnormality, it would fairly be held bound to pay the sale value of those lands, a value soon to be realized. And, furthermore, it would be a matter of grave consideration whether allowance should not also be made in the price for a large amount of water rights on Alameda creek, not then perfected, but in process of appropriation.

To summarize the conclusions of this sub-title: I find nothing in the various points of view described that will assist our judg-

ment as to the fair value, or to affect in any degree the conclusions arrived at by the more usual methods. I have reviewed those conclusions throughout, bearing in mind the primary requirement that the proof must be clear. I see no reason, in the light of the larger vision of the problem that may possibly have been acquired after ten months of work upon this report, to modify the conclusions reached and written down as each separate subject was considered. Round figures may, however, be adopted.

Accordingly, I find that the fair value of the plaintiff's property used and useful, and entitled to be considered as a proper basis for a fair return in rates for the service of water to San Francisco and its people during the years in question here was as follows:

[302]	1907-08	.....\$32,900,000
	1908-09	..... 33,400,000
	1909-10	..... 34,200,000
	1910-11	..... 35,100,000
	1911-12	..... 37,400,000
	1912-13	..... 38,400,000
	1913-14	..... 39,000,000
	1914-15	..... 39,000,000

To ascertain the net return, the fairness of which is the ultimate question in this litigation, it is necessary next to determine the gross revenues, and the proper operating and other charges against those revenues.

REVENUES

In each of these cases, by virtue of restraining orders or subsequent injunctions *pendente lite*, the operation of the ordinance whose validity is questioned was stayed beyond the year for which the ordinance was enacted, and consequently they have never been in effect. In such cases it frequently happens that courts have grave doubts as to what the legislation would have produced in revenues, by reason of the operation of the principle that consumption is frequently stimulated by a lower price; and there are a number of cases where the Supreme Court has dismissed a bill without prejudice, and remitted the complainant to an actual trial of the prescribed rates so as to eliminate this element of uncertainty. (*Des Moines Gas Co. vs. Des Moines*, 238 U. S. 153, 173;

Cedar Rapids Gas Light Co. vs. Cedar Rapids, 223 U. S. 655; *Willcox vs. Consolidated Gas Co.*, 212 U. S. 18, 42, 54; *Knoxville vs. Knoxville Water Co.*, 212 U. S. 1, 15, 17-19.)

[303] Happily, that doubt does not arise in this case. In the first place, under the requirements of the State Constitution, effective at the time covered by these ordinances, the period during which each was effective was limited to one year beginning July 1st, and consequently a dismissal without prejudice would, even with unusual expedition in concluding a suit, amount to a dismissal on the merits. In the second place, both the ordinance rates and the rates charged were, in great part, flat rates and not metered rates, so that the amount of use would not affect the charge in any event; the company would not gain revenue by increased consumption. It would, therefore, follow that the revenue under the ordinance would be a matter of computation. Doubtless for these reasons the parties are in agreement that the revenue that the ordinances would have produced would have been the revenue the company has actually retained, that is, the revenue actually collected less the impounded money.

In the 1907 case, No. 14,275, a temporary restraining order against the enforcement of the order was granted without bond or the requirement that collections in excess of the ordinance rates should be impounded. It was agreed on the hearing (9061-2) that the amount of such excess collections in 1907-08 was \$250,000. In the 1908-9 case, No. 14,735, the interlocutory injunction was subject to conditions that the company's charges fixed by it for water service should not exceed 15% of the ordinance rates; that such excess should be impounded in banks subject to the court's control until final decree; that in the event of the company's failing in the suit, the excess charges should be returned to the consumers, and that "in the event this court shall adjudge any charge or charges for water made by complainant excessive, whether said ordinance be valid or invalid, such excess of charge, provided the same shall also be in excess of the rates fixed by said ordinance, shall be returned to the person or persons from which it was collected". [304] It was conditioned also upon the filing of an undertaking in the sum of \$100,000, with the usual provisions and also a condition for the return of any charge or portion thereof adjudged by the court excessive. In the two following years, cases 14,892 and 15,131, the same form of order was made. In the four succeeding cases, the impounding of the 15% excess was provided for

by separate order or stipulation, and the injunction order omitted the conditions as separately stated above, including the one quoted, but included the provision for an undertaking, conditioned as before, including also that for the return of the excess, or any portion thereof deemed excessive. I think I make no mistake in saying that the company has in each year, since the order to that effect, charged the full 15% excess permitted to it. All collections have been impounded.

It is thus apparent that I must find the revenues that would have been collected if the ordinance had been effective and those actually collected; the fairness of the net return under the ordinance; the fairness of the net return actually collected, including the 15% excess impounded; and, finally, if the ordinance is declared invalid, but the actual charges excessive, the amount of actual net revenues which would have been fair, so that the portion deemed excessive may be returned. In the latter event, it amounts to fixing the fair rate of return for those years.

The parties agree, except as to trifling amounts, in the figures of gross revenue, excess charges impounded and gross revenue if the ordinance had been in effect. (See plaintiff's Exhibits 231, 201; defendant's Exhibits 208, 213.) But in defendant's Exhibit 235, it was pointed out by the city auditor that the agreed figures for revenue, as also for operating expenses and taxes, included the figures applicable to property non-operative and not here included in the rating base. There is a conflict between the parties as to the non-operative property. Referring to summary sheet 2 of Exhibit 235, I have accepted the city's [305] deductions under the following titles: Arroyo Valle, Poorman, etc., Stone and Pierce, Bay Slope, Pacific Slope, Ravenswood, Watershed land not in the case, Portola, West Union, Marin County, San Francisco. Strictly, there should be an allowance of part of the Stone land figures, but I have not attempted it. On the other hand, there should, perhaps, be some deduction under the title "Miscellaneous parcels", but I was not clear and so made no change, the amounts being small. My findings are shown in the following table:

Year—	Actual gross revenue	Excess impounded	Gross revenue at ordinance rates
1907-08	\$2,052,301.86	\$250,000.00	\$1,802,301.86
1908-09	2,507,469.76	187,996.87	2,319,472.89
1909-10	2,835,360.23	306,360.58	2,528,999.65
1910-11	2,893,648.04	319,497.60	2,574,150.44

Year—	Actual gross revenue	Excess impounded	Gross revenue at ordinance rates
1911-12	3,067,295.71	336,879.69	2,730,416.02
1912-13	3,243,523.36	352,503.30	2,891,020.06
1913-14	3,388,524.83	369,675.68	3,018,849.15
1914-15	3,467,437.32	381,634.69	3,085,802.63

In the revenue figures are included not only the receipts from water sales, but all other income from the property included in the rating base, rents from agricultural lands, for example.

As stated, the figure of \$250,000 in the year 1907-08 was not impounded, but is an agreed excess. In 1908-09, the amount impounded is less, for the reason that the injunction order was not entered until October 7, 1908, the rates were not raised until the following November 1, and so no money was impounded until December, 1908. [306]

OPERATING EXPENSES, TAXES AND DEPRECIATION ALLOWANCE

The proper annual allowance for depreciation reserves has already been fixed in connection with the discussion of depreciation of structures in the valuation of capital. Beginning in 1908, the company has charged on its books each year \$260,000 as a reserve for depreciation. This was originally calculated on a 3½% sinking-fund basis, and has not been changed. While ample reserves of this sort, even excessive charges, evince a wise business policy, it does not follow that we should regard them in a proceeding of this sort. I have made heavy deductions from the company's book allowances. To repeat, the sums allowed on account of accruing depreciation are the following: 1907-08, \$156,000; 1908-09, \$168,000; 1909-10, \$176,000; 1910-11, \$185,000; 1911-12, \$195,000; 1912-13, \$207,000; 1913-14, \$218,000; 1914-15, \$232,000.

As to taxes, the parties are in agreement as to the amounts allowable (Exhibits 221, 208), save that the city deducts \$1,353.79 in 1913-14 and \$3,370.76 in 1914-15, income tax upon bond interest, payable and paid by the company under the terms of the trust deed securing the bonds, which provided in effect that all interest should be paid free of tax. There has not been much attention paid to it upon the argument, but it appears to me that the effect of such an agreement is to increase the interest. It is not a tax on the company's property. Further, there must be allowed deductions of taxes upon property excluded from the rating base. (Exhibit 235.) The result follows:

[307]	1907-08—	\$321,812.56	less	\$8,859.32.....	\$312,953.24
	1908-09—	326,513.02	less	10,417.21.....	316,095.81
	1909-10—	342,553.23	less	11,922.59.....	330,630.64
	1910-11—	364,133.03	less	17,246.46.....	346,886.57
	1911-12—	373,795.80	less	19,135.93.....	354,659.87
	1912-13—	378,606.47	less	20,213.77.....	357,392.70
	1913-14—	480,404.67	less	22,657.07.....	457,747.60
	1914-15—	485,451.60	less	24,363.41.....	461,088.19

The operating expenses of the company as presented by the plaintiff's Exhibit 124 were questioned by the city (Exhibit 125) in several thousand items, covering in each year a large sum of money. The testimony is very voluminous, extending to every detail. The labor involved in settling this mass of questions has been greatly reduced by reason of the fair spirit of both parties in making concessions after the evidence was heard, and by the clear presentation of the facts in groups of related matters by the witnesses and by counsel in argument. The situation is very clearly summarized by Mr. Muhlner in plaintiff's Exhibit 176: the company's final position being shown in Exhibits 221 and 201. The city's concessions are noted in Exhibit 208. Defendant's Exhibit 235 shows the detail of operating expenses pertaining to property claimed not to be in use and useful.

There is no question of fact involved; with trifling exceptions it is agreed that the payments and the objects of the payments are sufficiently shown. Nor is it questioned that they were all proper corporate expenditures. The sole controversy is as to the accounting of the items questioned as operating expenses. The city contends that some of these are properly chargeable to capital as additions and betterments, and are already accounted for, therefore, in the appraisal of the lands and structures. Other items are claimed to be proper charges against depreciation reserves. As to [308] others, the contention is that they have no relation to the production and distribution of water, and should be paid out of surplus moneys available for dividends, rather than as a charge to operation; that, in other words, they should be borne by the stockholders and not by the rate payers. Just as extravagant construction and useless or unused lands are regarded as departures from a normal plant and eliminated in the appraisal of the capital entitled to a return, so extravagant or otherwise avoidable expenditures are regarded as abnormal and therefore not allowable in the operating account. In this case I recall no exception to payments on the ground of

extravagance; the company seems to have been operated prudently and with a wise economy. The city's objections rather take the form of a denial of any relation between the expenditure questioned and the necessities of the water business. There are few, if any, precedents in the reports. The test of the normal character of operating payments contended for by the city is substantially the one I have adopted in several reports in like controversies; in brief it is, could it have been avoided without impairing the service? Such a test has the advantage of embodying the strictness of construction which a court is enjoined by the controlling decisions to follow in testing legislation in relation to the Fourteenth Amendment. On the other hand, we must recognize a disadvantage in this test in this: that in any well-run business expenditures will normally be made on broad, general grounds of policy, that might have been avoided on strict grounds. It may well be argued that we are dealing with the operation of a business of great magnitude, and that we must view such matters in the broad way that reasonable business men would view them. There is the further consideration to be kept in mind that if we audit strictly and disallow items that normally are to be found in the expenditures of such a corporation, we in effect increase the risk and, by charging the expenditures to stockholders, [309] increase the rate of return that capital available for investment will demand. The way in which these various considerations operate will, I hope, be made to some extent definite in what follows.

I shall, for convenience, follow the order of presentation adopted in Exhibit 176, page 9 and following. It will not be possible to refer to every item considered.

By way of preface, it should be observed that prior to 1913 there were no accounting rules in force prescribed by public authority; but that since January 1, 1913, the rules of the State Railroad Commission have been in effect.

The testimony was presented by Mr. Muhlner, the company's assistant auditor, and by Mr. Metcalf for the plaintiff, and Mr. Bailhache, accountant for the city. I was impressed with the broad knowledge and intelligent application of accounting principles to the case in hand shown by the company's witnesses. The city's witness, on the other hand, seemed to have followed the plan of deducting every item possible from operating expense, however small the amount and however narrow or doubtful the reason for doing so; in case of doubt the item was thrown out, and many

errors were made that had to be corrected. One can hardly avoid considering the merits of the manifold items presented without being conscious of a feeling that the probabilities are with the company's audit, since that of the city has been so frequently plainly wrong and generally so characterized by too narrow an application of accounting principles.

The headings of the following paragraphs refer to the classification in Exhibit 176, p. 9 *seq.*, of the city's deductions from the operating account. The discussion must necessarily cover only typical cases. [310]

MISCELLANEOUS AND GENERAL DEDUCTIONS

Exhibit 176, pages 9, 11.

The amount involved under this heading during the eight years is \$23,565. Error to the extent of \$10,401.39 is conceded by the city in its revised Exhibit 208. The item of \$100, report of Engineer Mulholland on the Portola reservoir, a non-operating property, is a type of deduction which will not be made at this point, since all expenses concerned with properties out of use, as shown in Exhibit 235, can be most conveniently deducted at the end of the discussion. From its title, "Storrow's report on Lobos Creek", \$582.90, in 1908-09, would be another item of the same sort. From the transcript (9094-5) it would appear also to concern the Calaveras project, and there is nothing to show that it is included in Exhibit 235, under outside properties. However, both counsel treat it on the argument as concerned with Lobos creek, and so the deduction will be made later. Expenditures for maps and records are properly charged to operation; neither by Hazen nor by me have such items been appraised as capital. The items, transit \$184 and scales and scoop \$1.10, are typical of many such deductions made by the city's witness under this and other headings. His theory was that any article bought that was likely to last more than a year was a proper charge to capital (9092), and as such would be covered by the appraisal we have made. The company's practice was to charge such items off immediately through the operating account, as simpler than to account them as capital and set up a depreciation reserve for them (9092). The company's practice was correct; and since I have not included such tools and other small items in the capital appraisal or considered their value

in figuring the annual allowance for depreciation, it naturally follows that such exceptions to the operating account should be disapproved. The item of "Iron plates, storage and transportation", \$4,538.22, in 1911-12, is the only remaining item that merits reference. These plates were ordered in 1906 prior to the fire and arrived in 1906 and 1907 (9121). It was the company's intention to build a number of pipe lines, but its losses through the fire forced a change of plan. A very few were [311] made into pipe, but most of the plates were stored at the Risdon Iron Works at a cost, and when that concern ceased business in 1911 were transported to the company's yard at Millbrae, where they remain. The charge is for that storage and transportation. It was an abnormal expense which did not increase the value of the material. In my opinion, it was properly charged off to operation rather than accounted to capital. Certain concessions were made by the company in Exhibit 221, page "C"; otherwise the deductions from operating account claimed by the city are disapproved.

MISCELLANEOUS ELIMINATIONS

Exhibit 176, pages 11, 12, item 25; total amount, \$99,443.44.

After the hearing, numerous concessions were made by both sides. For example, the plaintiff has now charged donations to surplus instead of to operation, including \$26,500 subscribed to the Panama-Pacific International Exposition, and the amount of water bills refunded to hospitals, orphan asylums and the like. This is done with some demur, following, perhaps, the Railroad Commission's rule 114 and also the decision of the master in the Contra Costa Water Company case. There is force in the suggestion that if donations, such as a public service company would feel compelled by predominant public opinion to make to preserve harmony, are required by commissions and courts to be charged to surplus, there is an implication that the rates should be such as to yield a surplus (9130). It is an instance where if usual and proper corporate disbursements are denied accounting as operating charges, it increases the risk and tends to raise the rate of return which investors will demand.

The city claimed a deduction from operation of a total of \$812.42, covering the transcription of testimony before the Board of Supervisors in various years in rate-fixing proceedings. What-

ever may be said of the expense of legal proceedings which attack the validity of the state's legislation, there is no doubt that the normal and [312] proper expenditures made by a public service company in a hearing before the state's legislative body engaged in fixing rates must be borne by the rate payers. The propriety of this item as an operating charge was properly conceded by the city upon the argument.

Exception is taken to items of \$1836 in 1909-10, \$321.89 in 1911-12, and \$158.39 in 1912-13, described as expenses of Schussler lectures. The record is not entirely clear as to the occasion which dictated the giving of these lectures, whether in connection with the company's opposition to the grant to the city of water-rights in Hetch-Hetchy Valley, or in connection with the several attempts of the company and of the city's officials to secure the voters' approval of a purchase by the city of plaintiff's properties, or as part of a policy of securing public good will by an intelligent understanding of the system. I regard such expenditures as proper operating charges, by reason of the purpose, whatever the occasion. As a general principle the promotion, through judicious expenditures for publicity, of a proper understanding by the public of the companies and properties that serve them, will do much to induce good feeling, afford means of intelligent criticism and disarm that which is unfounded; the result would be in the direction of better service and better conditions, both for the utility and the community served. In the present case, there might have been even more publicity to the advantage of both parties; and no better instrument could have been found than Mr. Schussler.

A large item of the miscellaneous eliminations by the city is that described as "Reports on Spring Valley Properties," \$24,295.51, charged in 1912-13 to operating expense. (Exhibit 176, page 12.) The city's accountant deducted all this without much discrimination among items, on the ground that the expenditures were in furtherance of the company's opposition to the Hetch-Hetchy grant to the city. Some of these items were shown upon the hearing to be ordinary operating charges. Others, and also deductions for like expenditures (hydrographic [312a] work and the like) classified elsewhere in the Exhibit 176 of the city's deductions, were of permanent value as restorations of the company's records destroyed by the fire or otherwise permanently useful. The opposition to the Hetch-Hetchy grant was the *occasion* of doing this work in the particular year 1912-13 rather than

spreading it over several years (9340). The company is justly entitled to the benefit of this work; and as previously explained, such property as records, reports, maps, and the like, has not been appraised in this report as capital; it was therefore properly charged off through the operating account. Other expenditures were admittedly part of the Hetch-Hetchy contest. In Exhibit 218 will be found a detailed statement covering this item of \$24,295.51 and other items, engineering department salaries, and legal fees (see page 4, Exhibit 218), all expended in 1912-13, the total being \$44,179.07. The exhibit segregates this sum as \$25,028.53 applicable to the Hetch-Hetchy matter and \$19,150.54 to operating expense, as just explained. The segregation seems just in detail and is approved. As to the particular item of \$24,295.51 with which the discussion started, the segregation is \$11,179.95 to the Hetch-Hetchy contest and \$13,115.56 to operation. It results that as to the latter amount the city's contention is not sustained; the former will be reserved for separate discussion.

The next title in the classification of the city's deductions from operating accounts, as shown on page 9 of Exhibit 176, is "**General Salaries**," the deductions amounting to \$210,588.20 during the eight-year period. This refers to the view of the city's witness that certain proportions of the salaries of the company's general officers, actually charged to operation, should have been charged to capital, as part of the cost of permanent improvements during the period. I also quote the city's counsel in argument (Arg. 2026):

[313] "It appears that the complainant during the years in litigation has failed to charge any of its general salaries to capital account, although considerable sums have been expended in purchase of additional real estate, and large construction was undertaken in later years at Calaveras dam. All of the salaries of the executive officers and assistants were charged directly to operating expense. The practice we submit is neither in accordance with equity or approved accounting practice. Very generous allowances for overhead expenditures have been made in the valuation of the company's plant by all the engineering witnesses. If those overhead charges include general administration expense, as will be readily ascertained from an examination of the record of the testimony on the subject of overhead, we contend that a percentage of the general administration charges should be charged to

capital account and deducted from the operating expenses. Any other course would be equivalent to permitting the company to earn a return based on the inclusion of these charges in the reproduction value, and at the same time to include them in operation accounts, thus obtaining a double allowance."

Mr. Bailhache, the city's witness, found the proportion to be deducted from salaries paid to the company's general officers to be 44.7185%, as properly chargeable to capital instead of to operation, save that 10% was deducted from salaries paid in the auditor's department, and 90% of the salary of Mr. Schussler, the consulting engineer. (9143 *seq.*) The figure of 44.7% was obtained thus: all expenditures for permanent improvements, both land and structures during the eight years, 1907 to 1915, and all operating expenditures during that time (and as accounted by the company, not as reduced by the witness) were added together; the ratio of the total capital additions to the sum thus obtained was found to be 44.7185%. Knowing as we do that this was a period of sub-normal construction, the figure seems large, considering at the same time that this was an active operating business. When we depart from averages over the eight years and take particular years, doubt is accentuated; for example, in 1910-11 (Exhibit 125, Vol. I, page 1) gross permanent improvements are given by Bailhache at \$1,300,000 and operating expense at \$700,000, total \$2,000,000, round figures. He would thus conclude that in this year 65% of the salaries of general officers, representing the value of their services, should have been charged to capital. That would [314] result in a charge of \$455,000 for engineering and administration upon capital additions amounting to \$1,300,000, or an overhead (without interest) of 35%. (Compare with the 15% for all overhead used by Hazen in his appraisal.) In addition, we may note that expenditures for taxes are not included in estimating the ratio, though they would apparently be properly included.

But there is a much more evident defect in the process. There is here no objection to the amount or the propriety of these expenditures; they must be allowed somewhere. When the city says they should have been charged, not to operation, but to capital, the pertinency of the claim rests upon the fact that capital has been here appraised, not from the state of the books of account, but by expert witnesses to value. In other words, the city very properly seeks to avoid a duplication of the experts'

allowance for administrative overhead and of the actual payments during the years in question when the capital additions were made. The specific illustrations offered by counsel for the city in the argument just quoted, viz., real estate and the Calaveras dam, are unfortunate for his purpose. Neither in the appraisal of lands nor in that of the dam have I included any overhead. Overhead on lands was excluded in my appraisal, in deference to what was conceived to be the rule in the Minnesota Rate case; as to the dam, though 5% for administration was added by Hazen, I omitted all overhead, except as actually paid and charged to capital on the books, including none of the items here excepted to. As to the great bulk of permanent improvements during the period, there is thus no possibility of duplication; and as to the balance, the amount involved would be inconsiderable. The basis of Bailhache's apportionment therefore cannot be approved.

Bailhache paid no attention to the actual time employed by these general officers upon the work incidental to permanent improvement and knew nothing about it. (9159.) The test of time employed as a basis for an apportionment is not free from objection, but it certainly should be weighed when we are considering the salaries of officers of an operating corporation. Thus in the Uniform System of Accounts for Electric Railways, prescribed by the Interstate Commerce Commission, rule 11, as quoted by the city's counsel in argument (Arg. 2028), reads:

“When officers or employees give all or a substantial proportion of their time to construction or to addition and betterment work the whole or an equitable proportion of their salaries and their traveling and incidental expenses in connection with such work shall be included in the cost of the work.”

The inference is that if *less* than a substantial proportion of officers' time is given to capital additions, their salaries shall be charged to the operating account. That seems a common-sense rule of practice. And we must bear in mind that there is no indication, whatever, in the evidence that the operating account would have been less as regards these general salaries if not a dollar had been spent for capital additions during the period in question.

The only facts in evidence, as to the company's practice and as to the time spent by general officers in respect to capital additions is in the testimony of Mr. Eastman, the general manager. (9334-7, 9367, 11217.) The time of all engineers and other employees, both

in the field and office, engaged on new construction was charged to capital on the books, not to operation. The salaries of the president, vice-president and general manager, auditor, and the consulting engineer, Mr. Schussler, were charged to operation, their connection being regarded as incidental. As regards land acquisitions (which, as stated above, show no possibility of duplication), amounting to considerable sums—in 1911-12, for example, to \$2,078,825, Eastman stated that after the policy was formulated by the president and the executive committee, the task of acquisition was delegated to four real estate brokers. He himself was the only general officer who gave any time to that, and that was at night, when it did not interfere with his operating duties. Asked to roughly estimate the time of general officers devoted to improvements to [316] capital, he said: "It would be relatively such a small percentage of time over that period of years that it is very difficult to make any estimate; it would be such a small percentage compared to the whole that I do not think it would mean very much. My guess would be that it would be under 10%." (9336.) The company's policy has been to charge doubtful items to operation so as to avoid inflating capital. This is good practice.

The company's practice is supported by the accounting rules of the Railroad Commission of this State, effective January 1, 1913. In the Uniform Classification of Accounts for Water Corporations under "operating expense accounts," subhead "general expenses," rules E-33 and E-34 read:

"Charge to this account the salaries of general officers, including the President, Vice-President, General Manager, Secretary, Treasurer, Controller, Auditor, and all other officers whose jurisdiction extends over the entire business and whose services are not chargeable to any particular department. * * * the salaries of all clerks and assistants connected with the general office, except such as may be directly engaged in other departments, in which case their salaries should be charged to such departments direct. Where general office clerks also perform services for other departments, their salaries will be apportioned accordingly and charged to the respective departmental account in accordance with service performed."

Mr. Schussler, consulting engineer since November, 1908, at \$12,000 a year, is in a somewhat different position from the general officers. His advice has been sought in matters of daily operation

as well as new construction. (11217-18.) As in the case of the general officers, his employment would have been made if there were no new construction, but only matters of operation to care for. (11220.) Eastman says that "his time up to 25% could properly be chargeable to new construction." It is a reasonable inference that this would include land acquisitions as well as new structures, but the record is not clear.

Upon the whole matter involved in this subhead "General Salaries" I am of the opinion that \$3000 a year beginning in 1908-09 and ending 1914-15, will be an ample deduction to cover any possibility [317] of duplication between the capital appraisal and the operating accounts.

Before leaving this subject, it should be said that counsel's reference to "the very generous allowances for overhead" in the capital appraisal might cause misapprehension. One might infer that allusion was made to the amount of money allowed as overhead on the whole structural plant. Obviously the only possibility of duplication between the capital appraisal and the current operating expenses would be as to structural additions and betterments during the years in question, a comparatively small amount, if anything, not including new lands or the Calaveras dam; Bailhache does not make this error except as to the lands and dam. Secondly, the 14% allowed by me covered much more than general officers' salaries—a small fraction of the whole.

Furniture, \$13,082.52; Office Appliances, \$14,322.59; Engineering Equipment, \$2,774.41, Exhibit 176, page 9, have been covered by the discussion. I am not sure that these items have been covered in the allowance under Working Capital for stock-on-hand, but do not stop to inquire, as the point is immaterial. For they were renewals in great part, to a large extent occasioned by the fire of 1906. I have not considered or allowed for such items in my estimate of annual depreciation allowance. Items of short-lived property are best disposed of on the replacement method, i. e., charged off to operating account at once. There may be here or elsewhere items of additional property of small value, and sound accounting allows a discretion to any auditor to charge these off rather than add them to capital. Mr. Muhler's judgment in this regard seems to have been sound. The accounting practice apparently favored by Mr. Bailhache is cumbersome and impossible in the practice of a large corporation. The deductions are disapproved.

The deductions for **Hydrographic Work**, \$7,951.75 are likewise disapproved for reasons suggested above in connection with the item Reports on S. V. properties.

[318] As regards the items **Surveys**, etc., a total for the eight years of \$9,927.23, Exhibit 221, page C, shows a concession by the company; otherwise the charges seem to me properly in the operating accounts.

Advertising, Pamphlets, etc., \$6551.83. These include printing reports to stockholders, and notices to consumers to stop waste. It is hard to see any plausible ground for the exceptions thus taken by the city's witness. There is also included objection to the charge to operating account of several thousands of dollars in 1910-11 for printing the pamphlet "The Water Supply of San Francisco," Exhibit 178, for general distribution. It is aimed by illustrations and descriptive matter to give the public an adequate idea of the city's water supply, its present development and its future plans and capacities. While such efforts to promote an intelligent understanding are for the benefit of the owners of the plant, they are, in a broad but very real sense, for the benefit of the consumers dependent upon the supply, who, through their representatives, also regulate its charges and its consequent financial health. If there had been a fuller understanding, there would have been less of the friction which has been so harmful, both to the company and the city of San Francisco.

J. G. White and Company Inventory and Appraisal, 1911-12, \$41,987.99, 1912-13, \$14,036.07, 1913-14, \$1054.31, total \$57,078.37. Upon this matter see Transcript, pages 9343-4, 9181, 9182. I conclude that the payments were properly charged to operation, but the larger items should have been charged to a suspense account, and distributed over a period of years. A practical solution of all matters relating to this item will be to distribute the entire sum, in approximately equal parts, over an eight-year period beginning 1911-12. This obviously cuts the item in half so far as this litigation is concerned. The sum of \$7150 will be allowed in each of the four years beginning 1911-12. Deductions from and additions to the operating accounts for the various years will be as follows: 1911-12, deduct \$34,837.99; [319] 1912-13, deduct \$6886.07; 1913-14, add \$6095.69; 1914-15, add \$7150.

Fences, \$22,012.33. In 1909-10, when most of these expenditures were made, the company rebuilt many of its fences in a more substantial manner; later in this period some of these were re-

placed in part. In Exhibit 221, page "C," an amount of \$10,350 was conceded to be chargeable to capital instead of operation; \$1922.33 is claimed to be maintenance, and \$9740 renewals. The renewals were charged to operating expense rather than to the depreciation account apparently on the replacement method as was the company's practice before the first establishment of a depreciation reserve in 1908. These fences have been valued in the capital appraisal; but Metcalf justifies charging the renewals in question to operating account on the ground that, as a *fact*, whatever might be required on theoretical bases, the fund to amortize these fences had not had a chance to accumulate. In other words, if a fence, given fifteen years of life in the depreciation estimate, went out and was replaced in 1909-10, there would be in fact in the fund only one year's accumulation to meet fifteen years' wastage. (9195 *seq.*) As in the Contra Costa report, I shall approve this disposition of the matter as a just solution of a practical difficulty. Later it will be found that I have deducted from operation in the later years some items of renewal, on the theory that they were chargeable to the depreciation fund.

Tools and Appliances of Pumps and other Departments, \$4,459.46. The small tools, etc., at the pumping stations are included in the capital appraisalment as part of the value of the pumps; they must obviously be a fairly constant quantity, but they are continually being lost or broken and replaced. They are deducted by Bailhache on the theory that they were likely to last more than a year, and were deemed chargeable to depreciation account. Such things as tools cannot be conveniently handled in that way; they should be [320] charged off at once to operation. I have included no allowance for tools, etc., in my figures for annual depreciation allowance.

Telephone System, \$19,148.52. This item will follow the disposition of the item "Fences," which it resembles as to the pertinent facts.

Changing Location of Pipe Lines, \$15,476.23.

Care of Gardens, Protection of Trees, Forestration Maintenance, \$18,423.90; **Experimental Work,** \$732.57; **Roads,** \$14,188.31; **Pumps, Maintenance and Alterations,** \$1390.75; **Buildings, Maintenance and Alterations,** \$24,548.46; **Operating Supplies,** \$5034.11. I have carefully read the testimony and arguments upon these subjects; except in so far as the accounts have been modified in Exhibit 221, the deductions by the city's witness are not approved.

The items under **Auto equipment repairs and maintenance**, were settled by agreement (9236), and the result is carried into Exhibit 221.

The title, "**Repairs, Maintenance and Alterations**," \$53,877.93 in amount for the period, covers a great number of minor items and many pages of the record. Discussion cannot be attempted. The following deductions from the operating account will be allowed: 1909-10, crossing Alameda pipe line, \$775.79; 1911-12, replacing portion Belmont stack, \$619, deemed a charge to depreciation; 1911-12, bulkheads to prevent washouts (Tr., 9304), \$603.28, new construction; 1912-13, rock wall at cottage, \$254.58; 1912-13, blow-off and air valves, \$521.20; 1912-13, lumber land account, \$552.27; 1913-14, two transformers, \$35.70 and \$135.45.

A question arose as to \$7000 charged to operation in 1909-10 on account of replacement of the lining of the Sunol filter galleries. Originally of wood, they were replaced with concrete at a cost of \$18,000 or \$20,000 (9273), the \$7000 representing the cost of replacing with wood. Ordinarily, this sum would be charged to the [321] depreciation fund; but here as in the case of the fences, the fund had been established only one year. It seems to me fair to charge off on the replacement method for items going out of service at so early a date in the life of the fund. (9273-4.)

Exception is taken under this title to a charge in 1910-11 to operation of \$6550.22 for lowering a pump at Pleasanton. The pump was first installed in 1909; the lowering a year later was made for increased efficiency and economy of operation. Doubtless, the charge was properly made by the auditor, since, otherwise, there would be two costs of installing the pump in the capital account on the company's books. (9277.) On the other hand, I have grave doubt whether an allowance by me of this charge to operation would not duplicate an allowance for such matters as mistakes in general overhead. I have concluded to allow the deduction.

The items "change power line," 1911-12, \$312.49, and 1913-14, \$193.69, are part of the lowering of the pump; deductions allowed.

The title **Non-operating Accounts**, of Exhibit 176, page 10, is also covered by Exhibit 235. Taking up the latter exhibit at this point, the following operating expenses of properties not in use will be deducted: 1907-08, \$1478.63; 1908-09, \$4261.59; 1909-10, \$903.03; 1910-11, \$1309.28; 1911-12, \$799.17; 1912-13, \$2681.58; 1913-14, \$6618.46; 1914-15, \$8655.71.

Opposition to Hetch Hetchy Grant. This title covers the item "Presenting company's case," \$20,800.82 in 1908-09; the investigations and report to the Secretary of the Interior in 1912-13, as shown in segregation in Exhibit 218, at \$25,028.53; and a fee of \$5000 paid in 1908-09 to ex-Senator Spooner, then of the bar of New York, for advice as to whether a California municipality could establish and operate a competing waterworks. The first item named is not carried in operating expense, but separately as an item deductible from gross revenue to obtain net revenue; the other items were charged to operation and have been deducted by Mr. Bailhache. One might infer that the company viewed the first item [322] at the time as possibly a charge against surplus, rather than operation. (9348-9.) Just whom the case was presented to, whether the authorities at Washington, or the people of San Francisco, is not quite clear; however, it was in opposition to that city's plan of acquiring a supply from the Sierras. The company's position as to the 1912-13 expenditures is stronger. In order to show the necessity of the government grant, the city charged that the company's sources of supply, and its structural properties, were inadequate, and the quality of the water questionable; an issue was thus tendered which the company did not bring about, which it felt forced to meet and was invited by the government to meet. Both parties to some extent, and the city's counsel very plainly (9362), have confined their point of view to the actual case as presented—that is, of opposition to the city which is at once the regulating authority, the body of consumers, and the proposed competing agency. The opposition of the city has been intensified on this account. The question should, however, be viewed as if another private company were seeking the permit from the government, and in that light it takes this form: Are expenditures to prevent the establishment of a competing company properly chargeable to operation? In my report in the Contra Costa Water Company cases, I held that they were not; that they represented a risk of the business to be considered in fixing the rate of return. We have not had the court's ruling on that report as this is written, and the question is not free from doubt. I shall, however, follow that ruling here; and I am frank to say that if on the final computation and consideration of findings, it shall turn out that the city has lost this litigation, I shall feel better satisfied if it is so, after this somewhat sore point is ruled in its favor. In the plan whereby these deductions are effected, the base operating

figures to be revised will not include the item of \$20,800.82, so that that item can be dropped from [323] further consideration. The deductions will be \$5000 from the operating account of 1908-09 and \$25,028.53 from the operating account of 1912-13.

Expenses of Condemnation Suit. These, together with expenditures in connection with rate suits, were eliminated by Bailhache from the operating accounts, as properly chargeable to the stockholders through surplus, rather than to the ratepayers. It is apparent that there is a radical distinction between the rate suits and the condemnation suit. In the former the expense was incurred on the company's own initiative; in the latter, the company was made defendant in an action to enforce an involuntary sale of its properties to the city. It thus seems plain that expenses in the condemnation suit are allowable in the operating account; and in this principle the city's counsel agreed at the hearing (9189), and at the argument (Arg. 2036). He considers the amounts excessive, however, both in totals and in the basis on which they were prorated between the condemnation suit and the rate suits. He points out that the fruits of the expenditure have since been useful in the rate suits only, the condemnation being at a standstill, and suggests that when condemnation finally takes place the expense be accounted at that time. It seems to me this offers a rather doubtful solution of a practical problem; it involves holding an amount in suspense for final accounting in the operating costs of an indefinite future year. I cannot feel that the joint expense for the two classes of suits has been excessive considering the difficulty and importance of the matters at issue. If the material gathered has been used thus far only in the rate cases, it is to be said that that was not to be foreseen when the distribution of expenditures took place; and furthermore, the evidence shows that the record here will be used in pending rate-fixing proceedings before the Railroad Commission; and it is quite within the possibilities that it will be useful also when the same Commission is asked to fix a value for condemnation.

[324] It seems to me that the only matter to be considered is whether expenses for a common purpose were justly segregated. The facts are that prior to 1913 all legal and engineering expense was charged to the rate suits. After that, with both proceedings facing them, and without any knowledge as to which litigation would be tried first, the company's officials charged 60% of the preparation to the condemnation suit and 40% to the rate suits.

At that time, the greater importance of the condemnation proceeding and a belief that it would occupy more time and expense, suggested the ratio of apportionment named as a matter of judgment; and it does not seem to me the judgment can be criticized. Possibly it might have been better to have made an equal apportionment; with the result that about \$11,000 would have been thrown into the water-rate suits expense in 1913-14, and about \$2000 in the following year. The amounts involved, the difficulty of a correct division, and the undoubted fairness of the judgment exercised when the apportionment was made on the basis of the facts then in view, suggest leaving the charges as they stand.

These are (Exhibit 124, page 7, line 50), 1912-13, \$503.58; 1913-14, \$67,629.55; 1914-15, \$12,513.44. No deduction will be made.

[325] Rates-Suits Expense. The charges to this account are as follows (Exhibit 221, page E): 1907-8, \$3,434.12; 1908-9, \$20,380.69; 1909-10, \$9,456.50; 1910-11, \$11,813.83; 1911-12, \$25,846.49; 1912-13, \$7,211.23; 1913-14, \$36,075.94; 1914-15, \$18,927.13. So far as the record discloses, these expenditures were incidental to the cases at bar, excepting \$25,000 attorney's fees paid in 1911-12 for argument in the 1903 suit decided by Judge Farrington. Of the same character are the following charges agreed upon as the expenses of the plaintiff's bookkeeping department in preparing the records of 15% excess collections for filing in this court as provided by the order allowing a preliminary injunction: 1907-8, nothing; 1908-09, \$1,400; 1909-10, \$2,163.70; 1910-11, \$4,237.95; 1911-12, \$4,365.60; 1912-13, \$4,640.45; 1913-14, \$4,839.33; 1914-15, \$5,393.46.

The company's position is that expenditures for litigation "which it deems necessary" for the protection of its constitutional rights in regard to rate-fixing legislation, if incurred in good faith, should be allowed in the operating account as readily as expenses of litigation to protect its rights against individuals. It is unfortunately true that such suits as these and the attendant heavy costs are frequent enough to be regarded as normal, and therefore, if charged to surplus, increase the risk of the business and the rate of return which the investor of new capital will demand. These considerations tend to a stand-off; and as a practical matter, there is advantage in the definite accounting of these costs in allowed operation, rather than influencing the rate of return to an indefinite and very likely excessive extent **[326]** in an

upward direction. It must be remembered that neither the company, the rate-fixing body nor the court can fix the rate of interest which will compel new capital to flow into an agency in private hands that is doing the public service, except as the investor deems it attractive.

On the other hand, as the city points out, an adequate regulation of rates embodied in an ordinance, may, with entire good faith upon the part of the company, be rendered nugatory and be declared unconstitutional, if the allowance of the frequently very heavy expenditures in this class of litigation as operating charges is enough of itself to reduce the net revenue below the point of a fair return.

There is little reported authority on the point. In the 1903 case *Judge Farrington* excluded such expenditures from the operating account, saying (*Spring Valley Waterworks v. San Francisco*, 192 Fed. 190): "As to the seventh (item), proper costs will be awarded or apportioned in due time by the court. There is no reason why ratepayers should be compelled to bear the entire burden of this litigation, whether they win or lose." It is, of course, true that in the alternative, the company would thus bear the burden, win or lose. The suggestion as to costs, taken as referring to taxable costs, does not meet the difficulty, for the bulk of the expenditures in question will not be taxable. The suggestion of disposition according to the event of the litigation has, however, been valuable to me. I may also mention my report in *Contra Costa Water Company v. City of Oakland*, filed in October, 1916, not yet passed on by the court; there this matter was considered at greater length.

[327] I am still of the opinion expressed in the report just mentioned, namely: that in litigation to defeat an ordinance passed by constituted authority fixing rates for public service, expenditures in such litigation must be excluded from the operating account, to the end that the adequacy of the return provided may be determined on the same basis as would have prevailed if the ordinance had been accepted without litigation. To be sure, if on that basis, the litigation shows that the ordinance was unconstitutional as confiscatory, the expended money is not thereby recovered; but neither would it be if accounted in the operating expenses.

But here I think we may justly and properly extend the principle along the line pointed out by Judge Farrington's suggestion

that the event of the litigation should be given weight. This case shows that litigation of this character generally and, in fact, of necessity, extends beyond the period of operation of the legislation under attack. If in subsequent litigation of the same sort, it is shown that expenditures were made in litigation against the earlier ordinance, and that that litigation was successful, then it seems just to allow the charge in the operating account of the subsequent year, just as there would be allowed the costs of resisting a suit to dispossess the company of its property. In other words, the Board of Supervisors is bound to consider and make some allowance for costs of pending litigation that may be successful against its earlier acts, as well as for costs of ordinary litigation in which the company is involved. The charge of \$25,000 for counsel fees in 1911-12 in the case decided by [328] Judge Farrington in the company's favor as to the three ordinances effective from 1903 to July 1, 1906, is an exact instance in point. This charge will be allowed in the operating account of that year; but all the other expenditures, which concern the suits at bar, will be deducted. With the modification just made, the total deductions, including the bookkeeping as to the 15% excess are as follows: 1907-8, \$3,434.12; 1908-09, \$21,780.69; 1909-10, \$11,620.20; 1910-11, \$16,051.78; 1911-12, \$5,212.09; 1912-13, \$11,851.68; 1913-14, \$40,915.27; 1914-15, \$24,320.59.

If in the final review of the findings before me, it shall appear that the ordinances here in question are invalid, then, in the next phase, the determining in accordance with the injunction order whether the actual collections are excessive, the deductions last mentioned will not be made for the reasons already discussed; for the litigation would have justified itself by its success, and no question of defeating an ordinance solely through the expense of attacking it would be present.

This concludes the discussion of the city's deductions from the company's operating accounts. As a basis for applying the allowed deductions I have taken as the figures for operation embodying the plaintiff's concessions and agreed adjustments, the totals in line 18, page A, Exhibit 221, entitled "Total Operating Expenses and Taxes," less the totals of line 17, entitled "Accrued Taxes," and less line 14, "Presenting Company's Case." From these figures I have subtracted by years the sum of the deductions allowed by me in the foregoing pages. The result is as follows:

[329]

	Operating expenses	Master's deductions	Revised operating expenses
1907-08.....	\$641,612.63	\$ 4,912.75	\$636,699.88
1908-09.....	630,926.84	34,042.28	596,884.56
1909-10.....	728,728.53	16,299.02	712,429.51
1910-11.....	655,388.05	27,530.28	627,857.77
1911-12.....	714,929.18	44,765.02	670,164.16
1912-13.....	778,068.25	50,775.91	727,292.34
1913-14.....	856,519.27	44,802.88	811,716.39
1914-15.....	766,950.87	28,826.30	738,124.57

Summary of Amounts Deductible From Revenue

The sum of the amounts allowed in the respective years for depreciation (*supra*, page 306), taxes (*supra*, page 307), and operating expenses, as just determined, will give the total of amounts deductible from gross revenue to reach the net revenue. The results are:

	Depreciation allowance	Taxes	Operating expenses	Totals
1907-08....	\$156,000	\$312,953.24	\$636,699.88	\$1,105,653.12
1908-09....	168,000	316,095.81	596,884.56	1,080,980.37
1909-10....	176,000	330,630.64	712,429.51	1,219,060.15
1910-11....	185,000	346,886.57	627,857.77	1,159,744.34
1911-12....	195,000	354,659.87	670,164.16	1,219,824.03
1912-13....	207,000	357,392.70	727,292.34	1,291,685.04
1913-14....	218,000	457,747.60	811,716.39	1,487,463.99
1914-15....	232,000	461,088.19	738,124.57	1,431,212.76

And secondly, in the event that the ordinances are found invalid and that it thus becomes necessary to determine whether the actual collections (including the 15% excess) are excessive, [330] the determination of net revenue will be made by deducting from the figures of actual revenue the above totals and also the rate suit expenses previously deducted from operating account. In that event the total of deductible items will be as follows:

	Total deductions from revenue above	Rate suits expense	Totals
1907-08.....	\$1,105,653.12	\$ 3,434.12	\$1,109,087.24
1908-09.....	1,080,980.37	21,780.69	1,102,761.06
1909-10.....	1,219,060.15	11,620.20	1,230,680.35
1910-11.....	1,159,744.34	16,051.78	1,175,796.12
1911-12.....	1,219,824.03	5,212.09	1,225,036.12
1912-13.....	1,291,685.04	11,851.68	1,303,536.72
1913-14.....	1,487,463.99	40,915.27	1,528,379.26
1914-15.....	1,431,212.76	24,320.59	1,455,533.35

**Net Revenue Under Ordinances, and Actual Net
Revenue—Rates of Return**

We are now in a position to compute the net revenue, first, that which the ordinances would have produced if they had been in effect, and in the second table, the actual net revenue collected, the latter figures being of interest only in case it appears that the net returns under the ordinances would not have been fair. I also assemble the rating bases, or fair value of the property entitled to a return, as previously determined (*supra*, page 302), and show the percentages thereof which the net revenue affords.

[331]

TABLE I.

Net Revenue and Rate of Return at Ordinance Rates

	1907-08	1908-09
Fair value of property.....	\$32,900,000.00	\$33,400,000.00
Gross revenue at ordinance rates....	1,802,301.86	2,319,472.89
Taxes, operating exp. and depreciation allowance	1,105,653.12	1,080,980.37
Net revenue at ordinance rates.....	\$696,648.74	\$1,238,492.52
Net revenue, %.....	2.1%	3.7%
	1909-10	1910-11
Fair value of property.....	\$34,200,000.00	\$35,100,000.00
Gross revenue at ordinance rates....	2,528,999.65	2,574,150.44
Taxes, operating exp. and depreciation allowance	1,219,060.15	1,159,744.34
Net revenue at ordinance rates.....	\$1,309,939.50	\$1,414,406.10
Net revenue, %.....	3.8%	4%
	1911-12	1912-13
Fair value of property.....	\$37,400,000.00	\$38,400,000.00
Gross revenue at ordinance rates....	2,730,416.02	2,891,020.06
Taxes, operating exp. and depreciation allowance	1,219,824.03	1,291,685.04
Net revenue at ordinance rates.....	\$1,510,591.99	\$1,599,335.02
Net revenue, %.....	4%	4.16%

TABLE I—Continued.

	1913-14	1914-15
Fair value of property.....	\$39,000,000.00	\$39,000,000.00
Gross revenue at ordinance rates.....	3,018,849.15	3,085,802.63
Taxes, operating exp. and depreciation allowance	1,487,463.99	1,431,212.76
Net revenue at ordinance rates.....	\$1,531,385.16	\$1,654,589.87
Net revenue, %.....	3.93%	4.24%

[332]

TABLE II.

Actual Net Revenue and Rate of Return

	1907-08	1908-09
Fair value of property.....	\$32,900,000.00	\$33,400,000.00
Actual gross revenue.....	2,052,301.86	2,507,469.76
Taxes, operating exp. and depreciation allowance	1,109,087.24	1,102,761.06
Actual net revenue.....	\$943,214.62	\$1,404,708.70
Actual net revenue, %.....	2.8%	4.2%
	1909-10	1910-11
Fair value of property.....	\$34,200,000.00	\$35,100,000.00
Actual gross revenue.....	2,835,360.23	2,893,648.04
Taxes, operating exp. and depreciation allowance	1,230,680.35	1,175,796.12
Actual net revenue.....	\$1,604,679.88	\$1,717,851.92
Actual net revenue, %.....	4.69%	4.89%
	1911-12	1912-13
Fair value of property.....	\$37,400,000.00	\$38,400,000.00
Actual gross revenue.....	3,067,295.71	3,243,523.36
Taxes, operating exp. and depreciation allowance	1,225,036.12	1,303,536.72
Actual net revenue.....	\$1,842,259.59	\$1,939,986.64
Actual net revenue, %.....	4.95%	5%

TABLE II—Continued.

	1913-14	1914-15
Fair value of property.....	\$39,000,000.00	\$39,000,000.00
Actual gross revenue.....	3,388,524.83	3,467,437.32
Taxes, operating exp. and deprecia- tion allowance	1,528,379.26	1,455,533.35
Actual net revenue.....	\$1,860,145.57	\$2,011,903.97
Actual net revenue, %.....	4.77%	5.15%

[333] Summarizing the findings in the foregoing tables, it is thus found that the ordinances herein attacked would have produced, if they had been in effect, net returns upon the fair value of the plaintiff's property used and useful in the service of water to the people of San Francisco in the respective years, in percentages as follows: 1907-08, 2.1%; 1908-09, 3.7%; 1909-10, 3.8%; 1910-11, 4%; 1911-12, 4%; 1912-13, 4.16%; 1913-14, 3.93%; 1914-15, 4.24%. Secondly, it is thus found that the actual net returns, including the impounded money, were in percentages as follows: 1907-08, 2.8%; 1908-09, 4.2%; 1909-10, 4.69%; 1910-11, 4.89%; 1911-12, 4.95%; 1912-13, 5%; 1913-14, 4.77%; 1914-15, 5.15%.

The sums of money, the net revenues, represented by these percentages were the sums available to the owner-corporation for payment of dividends upon its shares of stock, interest upon its bonds, and the maintenance of a surplus fund to meet normal costs not accounted in operating account and to make up deficiencies such as may occur in the revenues of any year from unusual causes.

Do the percentages stated above as the percentages the ordinances would have produced constitute a fair return?

And likewise—were the percentages inclusive of the impounded money, as secondly set forth above, such as to render the actual charges to consumers excessive?

The Fair Rate of Return

What we desire to determine is the fair rate of return which the capital already invested and in fixed form in plaintiff's properties was entitled to earn in the different years in question as a reward for its dedication to the public service. The usual test for determining [334] that fair rate is, what rate of return would

in any such year attract new capital to an investment in plaintiff's property to provide additions or extensions thereto? I presume the theory is that the existing investor should receive at any time for the use of his capital already in the enterprise whatever a new investor would demand in return for new capital put in alongside the existing capital—or, otherwise expressed, the current market rate for money for this purpose. The point of view seems to me correct and helpful; and if I mistake not is acceded to by counsel for both parties.

It is the plaintiff's position (Arg. 1297) that a showing of less than 7% per annum net return is less than a reasonable rate. It is the city's position (Arg. 2052, 2070) that 5% is "non-confiscatory," or in other words, reasonable; it is not in terms conceded that less than 5% is unreasonable. Obviously, if 5% is the minimum reasonable rate, the invalidity of the ordinances is apparent, for at the ordinance rates, the maximum interest return in any of these years was 4.24% in 1914-15; and furthermore, the returns on the basis of actual collections, including the impounded money, are shown to have exceeded 5% only in the year 1914-15, when 5.15% was earned. But I cannot agree that 5% was a reasonable rate of return.

To state my conclusions at once: I am entirely clear in my mind, and I so find, that upon the evidence before me the rates of return upon the fair value of plaintiff's property, not only those that would have been earned if the ordinances under attack had been in effect, but also those actually earned, and in part impounded, under rates of service limited by this court's order for a preliminary injunction, were in each of the fiscal years beginning July 1, 1907, and ending June 30, 1915, unreasonably low, unfair and, in effect, confiscatory of plaintiff's property.

In considering the question of a fair rate of return, precedents [335] in judicial decisions and in commission rulings, taken at large from the reports, are of little value as regards rates approved; they are only aids to reasoning. For such cases will reflect many proper differences in the amount allowed, differences arising from the nature of the business, the time in question, and the place where the utility operates. It is, for example, readily arguable that the proper rates may differ as between public service companies of different kinds; and it is entirely plain that rates will differ at different periods, and also at different places during the same period of time. If, however, the court desires to review the

authorities, they will be found in the argument. (Arg. 1275, *seq.*, 2065 *seq.*) I regard the record and the argument in this case as furnishing a better discussion of the question than will be found in any report.

A few decisions should be given passing reference, though none are controlling.

In the leading case of *Willcox v. Consolidated Gas Co.*, 212 U. S. 19, the court makes an affirmative ruling as to the proper rate of return there applicable. Justice Peckham (page 48) referred to the variations that prevail as regards the fair rate in different cases and in different localities:

“The amount of risk in the business is a most important factor, as well as the locality where the business is conducted, and the rate expected and usually realized there upon investments of a somewhat similar nature with regard to the risk attending them. * * * The less risk, the less right to any unusual returns upon the investments.”

In the case of the Consolidated Gas Company, the court said the risk was “reduced almost to a minimum”; for it had a monopoly of the gas business of New York City, and future competition was “unthinkable”; that it was “the most favorably situated gas business in America.” The opinion then concludes:

“Taking all facts into consideration, we concur with the court below on this question, and think complainant is entitled to [336] 6% on the fair value of its property devoted to the public use.”

The time there in question was 1906, I am of the opinion that the differing circumstances, particularly as to the comparative risks involved and the differences in the money markets and rates of New York and San Francisco, would lead to the conclusion that, given 6% as a proper rate for the Consolidated Gas Company in New York in 1906, a higher rate would be proper for this plaintiff in 1907-15.

The matter has been discussed in several decisions in this court. In *Spring Valley Waterworks v. San Francisco*, 124 Fed. 574, in which the 1903 ordinance was in issue, Judge Morrow rendered an opinion on the application for a preliminary injunction, in which he found that there was indicated from the affidavits net earnings of 4.40% (page 600); that while the evidence was “clearly in favor of a rate of not less than 6 per cent per annum”

(598, 601), the presumption in favor of the legislative action (599), and the purposes of the inquiry (601) suggested the fixing of 5% as the minimum rate which the court could uphold. I do not regard this case as indicating or requiring the finding that either 5% or 6% would be fair for the cases at bar. For it was on an application for a temporary injunction, where, in advance of hearing, the court will always be very cautious about interfering with legislation. Secondly, the year 1903 was a period of low money rates. The present bond issue of plaintiff, for example, was dated December 1, 1903, and bears a rate of 4%; but during all the period from 1907 here in question they sold at considerably below par, though of the highest grade as regards security. That was a period when many bonds were put out at face rates of 4% and 3½%, where later 5% was the rule.

In *Contra Costa Water Company v. City of Oakland*, 165 Fed. 518, Judge Gilbert granted a preliminary injunction on a showing that ordinance rates for 1904 would earn less than 4% (531), citing [337] Judge Morrow's decision as a precedent (532), while disclaiming even an approximate conclusion on the merits of the case. (533.) So also in *Spring Valley Water Co. vs. San Francisco*, in the same volume, pages 657, 665, the same judge granted a preliminary injunction against an ordinance fixing rates for 1904, citing Judge Morrow's decision as a precedent on the facts and finding a probable return of 4.40% insufficient.

Spring Valley Water Co. v. San Francisco, 165 Fed. 667, is another opinion on application for preliminary injunction—Judge Farrington's decision in the 1908-09 case, one of those here on final hearing. There the learned judge, speaking in 1908, considered that a rise in rates of interest of 1% to 2% was probably only temporary (684), and that 5% net was "neither unreasonable nor confiscatory." This opinion is entitled to great weight, though not here controlling, especially as the judge later in the opinion (705) found that the probable actual return would be 4.03%, a rate less than was just or reasonable. The evidence on final hearing, taken after a lapse of years, has moreover shown that the then recent advance in rates for money which Judge Farrington mentions was not in fact temporary. And it is to be noted that in his decision on final hearing of the 1903-4, 1904-5, 1905-6 cases, *Spring Valley Water Co. v. San Francisco*, 192 Fed. 137, 192, Judge Farrington cited the three prior decisions for what they actually held, and contented himself with deciding that net rates

of 3.56%, 3.74% and 3.97%, shown in the cases before him were unjust, without stating what a reasonable rate would have been.

I could take the same course and halt the report here. But this is a master's report subject to review by higher courts, who may have divergent views on some of the many difficult principles of law involved in the valuation of capital; and so it seems wise to state the conclusions which inevitably have been formed in my mind from hearing the evidence as to the minimum just rate of return.

I have stated my views on the considerations which should or [338] should not govern a determination of this question quite fully in my report in the Contra Costa Water Company cases, and see no reason for repeating the discussion at length. It is equally applicable here. I call attention only to certain points.

(1) The fundamental principles that the court will always presume strongly in favor of legislative action, that the legislature has a discretion in fixing the rate of return, and that it is not a court's function to fix rates, must not, as it sometimes has, be allowed to cloud the issue and to justify non-interference with rates of service that produce returns which, on the proofs, are in the court's judgment too low. It is the court's duty at such times to act upon its judgment and set aside the judgment of the legislative body. The rate-fixing body may fix liberal, or rather high rates of return, as a state policy; or it may do so in connection with an unduly low appraisal of capital, and so reach the same net revenue as might be found proper by the court. But the court has its independent problem to be decided upon the evidence before it, and it must itself judge what is the minimum rate that can be called a reasonable one. Such a rate, as this court has held regarding "just compensation," is a fact, to be determined upon the evidence like any other fact. (124 Fed. 602, 165 Fed. 679.) And in determining the rate of return, or the applied result in fair net revenue—the "just compensation" which the law assures—the court is not fixing a rate, a legislative function looking to the future, but **declaring the facts in the past** and the rights of the parties in relation thereto, which is a judicial function. If it results that the exercise of the judicial function will influence subsequent legislative action looking to the future, no anomaly is presented, for legislatures are constantly and properly guided by judicial declarations of the law.

(2) Here, as frequently in my observation, the city seeks a

[339] standard for the net return upon public service property in the rates for which money is *loaned*. And specifically, the standard urged seems to be the ruling rate on real estate mortgages. Such rates furnish no standard at all and are of only incidental value. Even in loans, the rate varies with the risk, so that we may have a base rate without risk plus an increment to compensate for risk in the given case. In a business enterprise, the *lender* would properly demand an added increment to change his status to that of *owner*, and whether we call that added increment "profit" or "additional risk" is unimportant; we would thus get a rate made up of the base rate for use of money without risk, plus an increment for risk, plus profit. If this were not the case, persons with money would be lenders only, enterprise would have no reward and progress would cease. And if the state chooses to leave the furnishing of essential public service to private capital, it must recognize the additional claims to compensation of the *entrepreneur* of this service, and not regard him merely as a money-lender having good security.

(3) There are both favorable and unfavorable influences affecting the risk of the water business in San Francisco. The supplying of water, unlike gas or electricity or other public service, enjoys the advantage of a secure market for its product. Water is at once indispensable and without substitutes. On the other hand, the risks of loss of capital attending the ownership of plaintiff's securities, both stocks and bonds, during the period 1907-15 are illustrated in the evidence (*e. g.*, Exhibit 200). The bonds have sold, taking monthly average prices, from a low of $77\frac{1}{8}$ in January, 1908, to a high of $96\frac{3}{8}$ in February, 1912; the stock from a low of $18\frac{3}{4}$ in May, 1907, to a high of 66 in February, 1912. A part of this is due, to be sure, to the losses of the great fire and earthquake of 1906. The earthquake hazard is always present here; and while that fact affects the market for investment in this vicinity unfavorably as against the competition of other places seeking [340] capital, it is a disability which this company shares in varying degrees with other businesses here and should be reflected in local money rates.

But while water has no competitive commodity, and while this company, by a wise foresight, has protected itself rather securely from competition by any other privately-owned company, it has faced during this period, and still faces, the far more formidable competition of the city itself. For part of this period, apparently,

this threatened municipal competition was intended to extend even to a paralleling of the distribution system; later—and now—the intention seems to be to build the Sierra supply system and condemn the plaintiff's property. And while a court may have confidence that a just award will be made in such proceedings, a prospective investor may have doubts; and both court and investor will agree that the prospect of litigation is not attractive, especially when, as in such a question as the valuation of a property like this, it must follow a road that is long, difficult, and marked by conflicting or uncertain guide-posts.

So also the city's rate-fixing proceedings and the accompanying litigation have decreased the attractiveness of such an investment as this. For at least fifteen years these parties have been in the courts. Every ordinance of the Board of Supervisors from 1903 to 1915 has been enjoined as confiscatory, and has not been in effect. Public regulation of rates, *per se*, cannot increase the attractiveness of investment in public service properties, and will do so only when it is shown affirmatively to be wise and just. Here the yearly issuance of preliminary injunctions, not to mention the results of final hearings, would show to an intending investor a mistaken and unfair attitude of the public authorities toward this company. If the parties' difficulties had been settled fifteen years ago, I doubt not the Calaveras water would now be in the mains, and the city would have abundant and perhaps cheaper water. As it is, the [341] plant is underbuilt—and I must now conclude, as a result of unfair rate-fixing as well as the threat of municipal competition; and the company faces the necessity, within the near future, of bringing in the Calaveras supply at a cost for materials of construction greatly increased by the conditions of the war. For all these things, the consumers, unfortunately, must suffer in higher rates of charge; and part of this is in the higher rate of interest an investor will demand for the money that the company must have.

The evidence can be briefly reviewed. The city's evidence is not of much help.

There is offered, for example, the ruling rates for loans on real estate. As to this, the witness of most authority is Mr. George Tourny, vice-president and manager of the German Savings and Loan Society, a very large savings bank of this city, who was called by plaintiff. He testified (9433) that the rates, net to the bank, for loans on property in San Francisco and in the country were:

1907, 5% to 5½% city, 5½% to 6½% country; 1908, 5½% city, and 6% to 6½% country; 1909, 5½% to 6% city, and 6%-6½% country; 1910, the same; 1911, 5½%-6% city, and 6%-7% country; 1912, 5½%-6% city, 6%-7% country; 1913, 6% city, 6½%-7% country; 1914, 6%-6½% city and 7% country. These represented ruling rates, though some loans were made under particular circumstances at fractionally lower rates.

Mr. Boston, for the city, presented in Exhibit 209 a computation of interest bases upon which sales of bonds and selected stocks have been made on the San Francisco Stock and Bond Exchange in the years 1907 through 1914. His selection of stocks may be questioned. Standard sugar stocks, though fluctuating as the price of that staple has varied, are representative of an important kind of ordinary business investment. They should have been included in a computation aimed at determining averages, and operate to raise the rate. Figures are given inclusive and exclusive of the plaintiff's stocks. These, as the witness says, were on an abnormal basis (10622), selling at a price higher than the dividend warranted because of [342] speculative possibilities of sale to the city. I think they should be excluded. Mr. Atkinson, for the plaintiff, presented in Exhibit 231 a computation including all the stocks which Boston had omitted, excepting preferred stocks. The results follow:

	Bonds	Bonds Ex. S. V.	Selected stocks	Sel. stocks Ex. S. V.	All stocks	All stocks Ex. S. V.
1907.....	4.62	4.60	5.08	5.08	8.23	....
1908.....	5.30	5.17	3.87	3.85	8.48	11.16
1909.....	4.89	4.84	5.80	6.37	9.37	10.61
1910.....	4.93	4.90	4.94	6.30	7.34	8.69
1911.....	4.95	5.01	4.63	6.35	7.04	8.53
1912.....	5.12	5.17	4.46	6.67	7.57	9.29
1913.....	5.22	5.27	6.28	7.30	6.76	7.62
1914.....	5.30	5.36	6.95	7.73	7.19	7.86
<hr/>						
Average—						
1907-14 ...	5.06	5.07	5.31	6.72	7.87	9.28
Average of bonds and all stocks, omitting Spring Valley, 1907-14						
						7.29

I doubt if average rates of all bonds or stocks, or averages over an eight-year period, or still less, an average of both bonds and stocks over that period, have a sound statistical basis. It seems to me too much like an average of tons produced per acre over a

period of years of wheat, corn, barley, prunes, oranges and other soil products. However, I give these figures, and the final average of 7.29%, for whatever it may be worth.

At this point, perhaps, may be given the *cost* of money (without profit element) to the Spring Valley Water Company upon two issues of two-year notes secured by its treasury bonds. The first issue of \$1,000,000, at a face rate of 5½% was made December 1, 1913; the second, of \$2,500,000, at a face rate of 5%, was made September 1, 1915. Considering the discount and expense, and the amortization thereof, the actual rates paid on the proceeds of sales of the notes were, on the first issue, 7.22%, and on the second, 6.22%. (See details, p. 9470.)

[343] The city's case was completed by the offer of the testimony of James K. Moffitt, cashier of the First National Bank of this city. This is the type of witness most competent to advise the court in such matters as this. Mr. Moffitt had, however, not fully considered the specific problem before him, and in the end, offered no opinion on the matter in issue. His first answer to a hypothetical question was 5%; but he soon made it clear that this was intended to represent a dividend rate on stock in a settled business, with all difficulties between the city and the company removed, and values firmly established by authoritative decision. And finally (11154), he concluded that 5% was too low for the definite period 1907-15 with which we are concerned, considering the conditions of the money market.

Mr. F. L. Lipman, vice-president and manager of the Wells Fargo Nevada National Bank of this city, and Mr. George K. Weeks, manager of the San Francisco office of N. W. Halsey and Company, dealers in investment securities, were called on this subject by the plaintiff. Both of these men, by their experience, their impartial attitude, and their evident command of the subject upon which they spoke, have a right to the confidence of the court in their expert capacity. The direct testimony of each was prepared in writing in advance, and is the best presentation of the matter I have seen in my experience. Their testimony, though brief, is yet too long to quote, and too condensed to paraphrase adequately. The court will find more profit in reading it than in reading what has been said in this report. (Tr., 9372-87, 9412-21.) Both conclude that the fair rate here applicable, to this property, and in the period 1907-15, was, as a minimum, 7%. Mr. Weeks also stated 8% as the rate to be applied if the valuation were on the basis of

a new business, *i. e.*, without allowing a sum in the capital appraisal for going value.

Before hearing the evidence and upon my own inexpert knowledge, [344] I should have been inclined to find a rate fractionally lower than 7%. In view of the character of the evidence here, and especially in view of the absence of any good showing to the contrary, I am compelled to the view that the rate upon which these expert advisers unite should approve itself to my judgment.

Accordingly, from the evidence in this case, I find that the fair rate of return, net, which plaintiff was entitled to earn during the period 1907 to 1915 inclusive, for the service of water to San Francisco and its people, was seven per cent per annum upon the property values as found in this report. And if the court shall conclude that a sum for going value should not be included in the appraisal of capital in use, so that the works is valued practically as a new enterprise, then I find that the fair rate to be applied was eight per cent.

The margin between the fair rate as here found and the rates that would have been produced upon the application of the ordinance charges, as well as the rates produced by the actual charges, is so great as to leave no possible doubt that all the ordinances herein questioned were invalid, and that the rates actually charged were not excessive.

CONCLUSIONS

I shall not here summarize my findings of fact. Inevitably they are found throughout the report. In Tables I and II *ante* (pp. 331-2), are to be found what may be called ultimate findings as to fair value, gross revenue, net revenue and rate of return under the ordinances, and net revenue and rate under the actual charges.

Neither is it necessary to attempt to frame conclusions of law in full detail. It is sufficient to conclude as follows:

(1) That the ordinances passed by the Boards of Supervisors of San Francisco fixing water rates for each of the fiscal years 1907-08 to and including 1914-15 did not afford just compensation to plaintiff; that the rates therein prescribed were unreasonably low, unjust and confiscatory; and the said ordinances were void as a violation of the Fourteenth Amendment to the Constitution of the United States.

[345] (2) That the rates actually collected by plaintiff were not excessive, and that all moneys impounded in court should be

paid over to plaintiff, and all undertakings given as a condition of injunction orders be discharged.

(3) That plaintiff should have decrees accordingly, as prayed, together with its costs.

Dated this seventh day of August, 1917.

H. M. WRIGHT,
Master in Chancery.

APPENDIX 1

Detail of Appraisal of Merced Watershed According to Subdivisions in Map Exhibit 45

Tract No.	Acreage	Value per acre	Total
1 and 2	312.39	\$4,500	\$1,405,755
3	52.45	1,500	78,675
4	123.40	4,000	493,600
5	14.51	1,000	14,510
6	299.34	3,000	898,020
7	206.48	3,000	619,440
8	49.02	1,000	49,020
9	200.26	2,000	400,520
10	60.58	700	42,406
11	59.40	1,750	103,950
12	53.33	600	31,998
13	191.52	1,500	287,280
14	48.	500	24,000
15	41.37	1,000	41,370
16	66.12	850	56,202
17	54.94	700	38,458
18	111.52	1,000	111,520
19	47.77	700	33,439
20	42.33	200	8,466
21	100.79	1,500	151,185
22	115.01	1,750	201,267.50
23	126.06	1,000	126,060
24	10.53	3,000	31,590
25	89.25	3,000	267,750
Strip	6.34	2,500	15,850
		2,482.71	\$5,532,231.50
Average value per acre.....			\$2,228.30

APPENDIX 2

Value of Peninsular Watershed Lands, by Parcels Shown in Exhibit 8, With Cost and Witnesses' Figures

Parcel No.	Acreage	Date bought	Cost per acre	Baldwin	Hoag	Smith	MASTER Per acre	Total
2.....	20.40	1862	\$375	\$50	\$75	\$275	\$75	\$1,530
3.....	41.75	1862	6.59	60	25	38	38	1,566
4.....	4	1865	25	50	100	50}	...	350
						125}		
5.....	23.60	1866	...	60	75	142	75	1,770
5-1	28.33	1866	24.93	90	75	127	75	2,125
5-2	2,852.82	1866	5.48	100	60	58	58	167,000
6.....	80	1867	8.13	50	25	34	34	2,700
7.....	160.40	1867	...	40	40	39	40	6,416
8.....	160	1867	31.13	30	20	23	20	3,200
9.....	58.25	1867	6.87	20	20	15	15	874
12.....	102.79	1868	66.27	100	60	98	100	10,279
13.....	332.74	1868	24.44	100	60	88	85	28,183
13.....	15.15	1868	24.44	175	300	219	219	3,322
13.....	27.41	1868	24.44	200	300	247	247	6,766
14.....	175.26	1868	27.07	125	60	122	122	21,333
15.....	143.35	1868	70	300	275	290	300	43,005

APPENDIX 2 (Continued)

Value of Peninsular Watershed Lands, by Parcels Shown in Exhibit 8, With Cost and Witnesses' Figures

Parcel No.	Acreage	Date bought	Cost per acre	Bald-win	Hoag	Smith	MASTER Per acre	Total
16.....	67.61	1868	\$120	\$300	\$275	\$350	\$300	\$20,283
17.....	17.39	1868	120	300	275	300	300	5,217
18.....	30.19	1868	91.95	300	275	300	300	9,057
18.....	53.36	1868	91.95	250	275	234	234	12,507
19.....	43.12	1868	120	300	275	344	300	12,936
20.....	16.90	1868	120	300	275	325	300	5,070
21.....	20.72	1868	120	300	275	350	300	6,216
25.....	27.23	1870	29.96	25	25	15	15	408
27.....	67.49	1870	30.26	30	40	57	40	2,700
28.....	396.16	1870	26.25	25	{ 25 15	13 29	13 29	3,036 4,648
29.....	824.56	1870	6.31	30	20	5	20	16,491
33.....	153.50	1872	...	30	20	11	20	3,070
34.....	58.84	1874	12.10	20	30	15	15	883
36.....	103.14	1874	60.26	500	500	287	400	41,256
37.....	350.43	1874	30	175	175	117	175	61,325
38.....	23.82	1874	394.16	200	500	550	350	8,337
39.....	2,094.05	1874	17.86	150	100	64	80	167,524
40.....	9.33	1874	415.72	125	250	47	125	1,166
41.....	42.45	1874	133.48	150	150	84	150	6,367
42.....	22.38	1874	175	300	275	283	283	6,333
43.....	311.69	1874	29.25	40	15	50	40	12,467
43.....	80	1874	29.25	40	20	34	40	3,200
44.....	9.46	1874	85.43	200	350	67	200	1,892
45.....	147.47	1874	89.70	250	350	60	200	29,494
46.....	150.43	1874	89.70	200	250	77	200	30,086
47.....	49.25	1875	212.02	200	300	96	250	12,312
48.....	925.88	1875	60.25	175	175	93	150	138,882
49.....	643.90	1875	234.92	125	175	42	125	80,488
50.....	310.90	1875	87.17	200	350	65	200	62,180
51.....	17.52	1876	80	300	300	175	250	4,380
52.....	1.03	1876	50	200	300	200	200	206
53.....	5.18	1876	....	300	300	175	200	1,036
54.....	64.32	1876	48.65	300	400	202	300	19,296
55.....	24.70	1877	120	200	300	100	200	4,940
59.....	6.18	1879	25	200	350	291	291	1,800
60.....	243.80	1879	6.15	40	20	{ 14 15	14 15	3,470
62.....	43.17	1880	...	150	150	122	150	6,475
68.....	40	1883	...	40	25	10	20	800
68.....	{ 51.65 5.66 }	1883	...	70	60	68	68	3,881
68.....	116.08	1883	...	60	35	20	20	2,322
68.....	174.50	1883	...	125	125	66	66	11,410
68.....	441.88	1883	...	125	150	91.31	125	55,235
72.....	8.80	1886	85	300	500	325	325	2,860
73.....	276.45	....	85	400	500	225	350	95,757
89.....	47.06	1886	100	200	350	291	291	13,794
90.....	856.10	1886	161.13	400	400	204	350	299,635
91.....	28.55	1887	164.62	150	150	98	150	4,282
92.....	31.31	1887	406.19	200	450	478	450	14,090
94.....	4.95	1887	709.24	200	300	125	200	990
96.....	12.20	1887	274.84	200	300	242	200	2,440
97.....	68.09	1887	86.42	150	250	91	150	10,213

APPENDIX 2 (Continued)

Value of Peninsular Watershed Lands, by Parcels Shown in Exhibit 8, With Cost and Witnesses' Figures

Parcel No.	Acre-age	Date bought	Cost per acre	Bald-win	Hoag	Smith	MASTER Per acre	Total
101.....	240	1888	\$1.56	\$25	\$15	\$15	\$15	\$3,600
102.....	160	1888	...	40	25	36	25	4,000
104.....	327.90	1888	32.02	50	40	43	40	13,116
106.....	295.90	1889	10	100	60	87	67	17,754
110.....	2.10	1889	116.50	200	250	49	125	250
122.....	117.48	1893	126.50	75	75	73	73	8,538
124.....	165	1894	10	60	25	43	40	6,600
128.....	47.93	1896	10.93	30	20	{ 20 } 5	20	959
130.....	390.04	1897	15.38	50	60	63	60	23,402
132.....	340	1897	30.75	70	50	21	40	13,600
132.....	165.75	1897	30.75	70	20	40	20	3,315
132.....	160	1897	30.75	125	125	57	57	9,060
134.....	52	1898	24.89	70	40	18	30}	6,000
134.....	148.92	1898	24.89	70	40	18	30}	
138.....	320	1899	10	30	20	{ 8 } 14	8	1,249
144.....	152.43	1904	100	250	250	112	150	22,864
146.....	15.89	1905	...	30	30	35	..	477
153.....	1,066.11	1906	75.04	100	75	55	75.04	80,000
164.....	429.20	1906	45	175	225	77	150	64,380
182.....	34.45	1907	101.81	150	250	120	120	4,125
191.....	449.19	1908	79.21	100	125	37	100	44,919
194.....	1,059.87	1909	37.75	125	150	42	100	105,987
195.....	503.30	1909	42.15	125	175	61	100	50,330
196.....	80	1909	31.53	40	30	39	40	3,200
199.....	50.53	1909	37.69	50	75	24	40	2,021
202.....	92.73	1910	69.34	100	160	47	100	9,273
202.....	153.16	1910	69.34	150	140	68	100	15,316
203.....	32.54	1910	139.37	100	125	77	100	3,254
205.....	314.30	1910	83.69	150	175	80	100	31,430
208.....	156	1911	103.17	200	175	75	150	23,400
210.....	214	1911	131.52	150	150	41	100	21,400
211.....	346.10	1911	94.18	150	160	79	100	34,610
212.....	10.23	1912	56.50	125	150	50	100	1,023
218.....	22.84	{ 1914 } { 1868-71 }	...	300	275	271	300	6,852

Total acreage 21,962.97

\$2,264,143

Average value per acre, 1913, \$103.08.

APPENDIX 2 b

Miscellaneous Lands. San Mateo County

Parcel No.	Acre-age	Date bought	Cost per acre	Bald-win	Hoag	Smith	Master total	Description
87	7.72	1886	\$230	\$3,000	\$2,500	...	\$19,300	Ocean View pump lot.
168	59.783	1907	909	1,500	1,250	\$342	59,783	Millbrae Reservoir.
133	51.71	1898	302	1,000	1,000	550	51,710	

APPENDIX 2 b

Miscellaneous Lands. San Mateo County

Parcel No.	Acre-age	Date bought	Cost per acre	Bald-win	Hoag	Smith	Master total	Description
131	15.356	1897	\$267	\$1,500	\$1,500	\$675	\$23,034	Millbrae pump lot.
193	140.40	1909	513	650	600	382}	87,751	Silva tract.
24	5.85	1869	300	650	600	382}		
95	44.67	1887	179	750	500	375	22,235	Belmont pumps.
158	33.825	1906	262	500	400	309	13,588	Belmont Reservoir lot.
157	1,328.22	1906	30	50	50	19	40,195	Cost, Ravenswood marsh.
156	285.95	1906	36	50	50	25	10,274	Cost, Ravenswood marsh.
155	191.28	1906	26	50	50	17	5,003	Cost, Ravenswood marsh.
154	40.85	1906	250	300	200	158	10,998	Cost, Frisbie tract.
129	.42	....	...	1,260	1,050	420	1,050	San Mateo screen house lot.
							\$344,921	

APPENDIX 3

Alameda Lands. Map 10. Exhibit 8

Parcel No.	Acreage	Year bought	Cost per acre	Gale Schween	Callaghan Parsons	MASTER Per acre	Total
239c	30	1899	\$354	\$500	\$500	\$500	\$15,000
239d	18.067	1899	354	200	150	150	2,710
239e	1.53	1899	354	500	500	500	765
239f	.52	1899	354	500	500	500	260
239g	1.138	1899	107	500	500	500	569
239h	108.48	1899	166	500	500	500	54,240
239i	92.501	1899	107	300	350	300	27,750
				(S 250)			
239j	137.50	1899	138	500	500	500	68,750
239k	159.28	1902	144	500	500	500	79,640
239 l	91.204	1902	147	500	500	500	45,602
				(S 450)			
239m	4	1900	465	500	500	500	2,000
				(S 450)			
239n	20	1902	464	500	500	500	10,000
				(S 450)			
239o	51.35	1900	400	500	500	500	25,675
				(S 450)			
239p	54.69	1900	231	500	500	500	27,345
				(S 450)			
239q	28.37	1900	411	500	500	500	14,185
239r	43.92	1900	400	500	500	500	21,960
239s	4	1900	866	500	500	500	2,000
239t	10.88	1900	551	500	500	500	5,440
239u	10.12	1900	633	500	500	500	5,060
239v	8.12	1900	633	500	500	500	4,060
241G	76	1902	488	450	500	475	36,100
268O	299.74	1911	566	500	266	450	134,883

APPENDIX 3 (Continued)

Parcel No.	Acreage	Year bought	Cost per acre	Gale Schween	Callaghan Parsons	MASTER Per acre	Total
268P	11.64	1911	566	1,000 (S 1,200)	500	750	8,730
268Q	241.43	1911	566	500	300 (P 400)	425	102,608
268R	64.70	1911	566	550	400 (P 410)	475	30,732
268S	296.679	1911	263	300 (S 275)	180 (P 190)	250	74,170
268T	3.78	1911	263	350 (S 375)	400	400	1,512
268U	785.00	1911	263	350 (S 325)	300 (P 250)	325	255,125
268V	338.01	1911	263	250 (S 275)	125	225	76,052
270	102.28	1911	360	300 (S 325)	150	200	20,456
271	63.78	1911	347	300 (S 275)	120	150	9,567
272	10	1911	501	500	400 (P 450)	500	5,000
273	5	1911	500	500	400	500	2,500
274	10	1911	231	250	120 (P 125)	150	1,500
275	40.61	1911	305	450	325	400	16,244
276	16.44	1911	548	750 (S 650)	500	600	9,864
277	11	1911	887	500	400 (P 450)	500	5,500
278	177.37	1911	830	500	400 (P 450)	450	79,816
279	177.533	1911	275	200 (S 225)	120 (P 125)	150	17,730
280	70	1911	662	500 (S 525)	400	475	33,250
281	50	1911	527	500 (S 450)	310 (P 320)	400	20,000
282	68.53	1911	512	428	300	400	27,412
283	143.14	1911	450	525	290	400	57,256
283	101.05	1911	450	425 (S 450)	290	350	35,367
283	106.72	1911	450	450	290	375	40,020
283	40	1911	450	375 (S 350)	200	325	13,000
284	16.70	1911	442	450 (S 425)	240	400	6,680
286	17.28	1911	868	500	300	400	6,892
288	1191.61	1911	148	210 (S 200)	100	150	178,741
289	47.37	1912	364	325	150	150	7,106
291	210.547	1912	248	275	100 (P 120)	250	52,637

Total 5,609.599 acres

Total Map 10.....\$1,779,461

Average per acre.....\$317

APPENDIX 3 (Continued)

Map 11

Parcel No.	Acreage	Year bought	Cost per acre	Gale Schween	Callaghan Parsons	MASTER Per acre	Total
224	.25	1875	\$...	\$...	\$100	\$100	\$25
224	39.415	1875	...	...	100	100	3,941
225	11.8783	1875	...	1,000	750	750	9,433
225	.699	1875	...	500	750	750	
229	.371	1875	...	...	100	100	37
225 } 231 } 232 } 235 }	56.99	1889	124	...	100	100	5,699
233	2.78	1891	540	...	100	100	278
237	10.65	1899	50	200 (S 225)	100	100	1,065
239A	73.32	1898	109	...	35	35	2,566
239B	263.56	1898	57	12	35	35	9,225
239C	109	1898	64	20	10	10	1,090
239D	14.26	1898	154	36	35	35	500
239E	29.99	1898	150	25	35	35	1,050
263	6.87	....	...	...	100	100	687
Total 620.0333 acres							\$35,596
Average per acre.....							\$57

Map 12

Parcel No.	Acreage	Year bought	Cost per acre	Gale Schween	Callaghan Parsons	MASTER Per acre	Total
228	198.94	1887	\$150	\$60 (S 65)	\$35	\$40	\$7,958
239b	20.32	1902	153	100 (S 75)	150	150	3,048
239b	5.82	1902	153	100 (S 75)	150	150	873
239w	4.15	1900	481	350	150	250	1,038
239F	9.81	1898	153	75	35	50	490
239G	22.25	1898	23	250 (S 300)	150	250	5,562
239H	1,172.16	1898	23	60 (S 55)	30 (P 35)	35	41,026
239I, J, K	1.29	....	...	...	...	...	300
239L	2,317.59	1902	77	150 (S 155)	89	118	273,476
239N	764.86	1901	32	60 (S 56)	40	55	42,067
239O	421	1901	40	50	40	40	16,840
244	110	1905	103	200 (S 175)	75 (P 100)	150	16,500
252	.6	1907	...	...	...	...	100
261	15.25	1909	227	300 (S 250)	200	250	3,812
262	4.25	1909	426	200	150	200	850
267	175.04	1910	30	75 (S 70)	35	40	7,002
268A	256.90	1911	100	125 (S 100)	55	75	19,267

APPENDIX 3—Map 12 (Continued)

Parcel No.	Acreage	Year bought	Cost per acre	Gale Schween	Callaghan Parsons	MASTER Per acre	Total
268B	250.78	1911	\$100	\$150	\$75 (P 80)	\$110	\$27,586
290	652.23	1912	65	100	80 (S 85)	85	55,440
Total 6,403.24 acres							\$517,235
Average per acre.....							\$80

Map 13

Parcel No.	Acreage	Year bought	Cost per acre	Gale Schween	Callaghan Parsons	MASTER Per acre	Total
239a	480	1901	\$12	\$15 (S 17.50)	\$8 (P 10)	\$10	\$4,800
239P	460.63	1901	35	40	45	45	20,728
239Q	453.37	1901	35	45 (S 40)	35	40	18,135
239R	397.53	1901	35	45 (S 40)	30	35	13,914
239S	893.15	1901	18	25 (S 27.50)	35 (P 30)	30	26,795
239T	1,038.29	1901	18	30 (S 32.50)	20 (P 25)	30	31,149
239U	313.61	1901	17	10	8	10	3,136
239V	229.25	1901	17	17.50 (S 20)	10	12.50	2,867
239W	107.85	1901	13	17.50 (S 15)	12.50	15	1,618
239X	640	1901	13	12.50 (S 15)	10	10	6,400
239Z	364.65	1901	12	20 (S 18)	10	12.50	4,508
Total 5,378.33							\$134,050
Average per acre							\$25

Map 14

Parcel No.	Acreage	Year bought	Cost per acre	Gale Schween	Callaghan Parsons	MASTER Per acre	Total
239Y	640	1901	\$13	\$20	\$10	\$10	\$6,400
243A	80	1901	20	25 (S 18)	10	13	1,040
243B	640	1901	13	25	15	15	9,600
243C	120	1901	21	25 (S 20)	15	15	1,800
243D	40	1901	33	25 (S 20)	15	15	600
243I	160	1901	8	15	7	8	1,280
243J	160	1901	16	15	7	8	1,280
243K	160	1901	10	15	5 (P 7)	7	1,120
243M	87.79	1901	23	25 (S 20)	18	18	1,580
243N	237.81	1901	24	25 (S 30)	18	22	5,232

APPENDIX 3—Map 14 (Continued)

Parcel No.	Acreage	Year bought	Cost per acre	Gale Schween	Callaghan Parsons	MASTER Per acre	Total
243O	23	1901	\$89	\$25 (S 30)	\$18	\$18	\$414
243P	160	1901	26	25 (S 35)	18	20	3,200
243Q	661.80	1901	13	15 (S 17.50)	7.50	7.50	4,964
243R	640	1901	9	15 (S 12.50)	5	5	3,200
243S	324.10	1901	21	15 (S 17.50)	15	15	4,861
243T	160	1901	28	5 (S 8)	5	5	800
243U	160	1901	7	6 (S 8)	5	5	800
243V	640	1901	9	5 (S 7.50)	4 (P 4.50)	4.50	2,880
247	164	1906	36	15 (S 20)	5	7	1,148
268N	214.87	1911	88	150	50	88	18,909
Total 5,473.37 acres							\$71,108
Average per acre							\$13

Map 15

Parcel No.	Acreage	Year bought	Cost per acre	Gale Schween	Callaghan Parsons	MASTER Per acre	Total
239M	3,314.04	1902	\$52	\$50 (S 51)	\$40	\$44	\$145,718
250	1,448.03	1907	41	25	14 (P 15)	15	21,720
264	82.13	1909	59	50	40	40	3,285
268C	494.89	1911	51	75 (S 80)	41	60	29,693
268D	298.91	1911	35	30 (S 35)	27.50 (P 30)	30	8,967
285	137.33	1911	74	50 (S 35)	20	25	3,433
Total 5,775.33							\$212,816
Average per acre							\$36.85

Map 16

Parcel No.	Acreage	Year bought	Cost per acre	Gale Clayton	Callaghan Parsons	MASTER Per acre	Total
223	440	1875	\$11	\$15 (C 10)	\$8	\$12.50	\$5,500
225	1,720	1875	...	30	18	25	43,000
241A	634.08	1902	39	20 (C 25)	11	18	11,413
241E	240	1902	39	25	8	8	1,920
241F	40	1902	50	25	10	10	400
246	474.12	1906	19	20 (C 17.50)	13.50 (P 15)	20	9,482

APPENDIX 3—Map 16 (Continued)

Parcel No.	Acreage	Year bought	Cost per acre	Gale Clayton	Callaghan Parsons	MASTER Per acre	Total
251	1,062.95	1907	\$25	\$25	\$17	\$20	\$21,259
258	151	1907	19	15	15	15	2,265
268p	160	1911	8	20	15	20	3,200
268W	646.75	1911	26	30	30	30	19,403
				(C 35)			
268X	396.64	1911	27	30	25	30	11,899
				(C 35)	(P 30)		
268Y	120	1911	21	15	15	15	1,800
295	320	1912	56	25	10	20	6,400
320	120	1875	...	60	50	50	6,000
				(C 75)			
322	160	1875	70	75	100	100	16,000
				(C 100)			
323	200	1875	68	150	120	150	30,000
				(C 200)			
324	200	1875	100	160	120	160	32,000
				(C 185)			
325	800	1875	38	55	56	55	44,000
				(C 50)	(P 49)		
327	80	1889	24	30	20	30	2,400
				(C 40)			
328	200	1891	6	12.50	10	10	2,000
				(C 15)	(P 8)		
329	40	1891	6	12.50	10	10	400
				(C 25)	(P 8)		
Total 8,205.54 acres							\$270,741
Average per acre							\$33

Map 17

Parcel No.	Acreage	Year bought	Cost per acre	Gale Clayton	Callaghan Parsons	MASTER Per acre	Total
241B	640	1902	\$39	\$10	\$5	\$8	\$5,120
				(C 15)			
268e	320	1911	12	15	10	15	4,800
				(C 25)			
268q	160	1911	17	12	5	5	800
268r	320	1911	8	12	10	12	3,840
				(C 15)			
268r	160	1911	8	10	10	10	1,600
268s	80	1911	9	10	7.50	7.50	600
268t	280	1911	8	10	7	10	2,800
					(P 7.50)		
268u	160	1911	6	10	7	10	1,600
					(P 7.50)		
268E	320	1911	17	17.50	10	15	4,800
				(C 25)			
268E	140	1911	17	17.50	12.50	15	2,100
				(C 25)			
268E	160	1911	17	3	4	4	640
				(C 6)	(P 5)		
268F	320	1911	26	15	10	15	4,800
				(C 25)			
268F	20.20	1911	26	25	50	50	1,010
				(C 30)			

APPENDIX 3—Map 17 (Continued)

Parcel No.	Acreage	Year bought	Cost per acre	Gale Clayton	Callaghan Parsons	MASTER Per acre	Total
268G	480	1911	\$13	\$12.50 (C 15)	\$8	\$10	\$4,800
268H	320	1911	12	18 (C 25)	10 (P 12.50)	18	5,760
Total 3,880.2 acres							\$45,070
Average per acre							\$11.61

Map 18

Parcel No.	Acreage	Year bought	Cost per acre	Gale Clayton	Callaghan Parsons	MASTER Per acre	Total
241D	244.22	1902	\$39	\$20 (C 30)	\$15	\$20	\$4,884
268a	15	1911	65	30 (C 35)	35	35	525
268b	197.31	1911	71	65 (C 75)	35	55	10,852
268c	155.42	1911	48	60 (C 75)	40 (P 45)	50	7,771
268e	82.88	1911	12	60 (C 75)	25 (P 35)	50	4,144
268f	85.63	1911	62	60 (C 70)	40	50	4,281
268g	160	1911	102	65 (C 75)	30 (P 35)	50	8,000
268h	120	1911	42	30 (C 40)	10	10	1,200
268i	273.24	1911	46	50 (C 60)	30	35	9,563
268j	80	1911	75	60 (C 85)	35 (P 30)	50	4,000
268k	80	1911	75	40 (C 85)	35 (P 30)	50	4,000
268 l	321.44	1911	70	50 (C 75)	23 (P 21)	30	9,643
268m	180	1911	71	25 (C 50)	12 (P 12.50)	15	2,700
268n	58.25	1911	22	30 (C 40)	15	25	1,456
268o	9.06	1911	33	10 (C 40)	15	10	91
268p	701.26	1911	8	20 (C 26.50)	15	20	14,025
268y	160	1911	16	20 (C 25)	15	20	3,200
268Z	40	1911	28	20 (C 35)	35	20	800
321	492.9	1875	59	100 (C 125)	77	100	49,290
330	311	1892	74	100 (C 200)	125	125	38,875
331	160	1893	68	90 (C 175)	125	110	17,600
345A	79.33	1910	59	45 (C 55)	35 (P 30)	40	3,173

Total 4,006.94 acres

Average per acre\$49.93

\$200,073

APPENDIX 3 (Continued)**Map 18 a**

Parcel No.	Acreage	Year bought	Cost per acre	Gale Clayton	Callaghan Parsons	MASTER Per acre	Total
241C	640	1902	\$39	\$6 (C 15)	\$5	\$5	\$3,200
268e	640	1911	12	12	5 (P 7.50)	8	5,120
268p	480	1911	8	8 (C 20)	8 (P 9)	10	4,800
268 p	643.80	1911	8	10 (C 20)	13	15	9,657
268r	320	1911	8	10 (C 12)	5	10	3,200
268v	160	1911	8	6 (C 15)	4.50	5	800
268v	480.24	1911	8	7 (C 6)	2.50 (P 5)	5	2,401
268w	160	1911	9	5 (C 15)	4.50	5	800
268x	160.72	1911	9	3 (C 6)	2.50	5	804
Total 3,684.76 acres							\$30,782
Average per acre.....							\$8.40

SUMMARY**Appendix 3. Maps 10-18 a**

Lands Map 10,	5,609.599	acres.....	\$1,779,461
Lands Map 11,	620.0333	acres.....	35,596
Lands Map 12,	6,403.24	acres.....	517,235
Lands Map 13,	5,378.33	acres.....	134,050
Lands Map 14,	5,473.37	acres.....	71,108
Lands Map 15,	5,775.33	acres.....	212,816
Lands Map 16,	8,205.54	acres.....	270,741
Lands Map 17,	3,880.20	acres.....	45,070
Lands Map 18,	4,006.94	acres.....	200,073
Lands Map 18a,	3,684.76	acres.....	30,782
Total.....			\$3,296,932
Average per acre, \$67.23.			

APPENDIX 4 A

Average Draft From Pleasanton Wells, Sunol Galleries and Alameda System, 1912-1915, in Million Gallons Daily. Being Exhibit 219, Re-computed to Show Results by Fiscal Years

1912-13	Pl.	Sunol	System
Av. 2d 6 mos. 1912.....	7.76	3.06	10.82
Av. 1st 6 mos. 1913.....	7.56	9.37	16.93
2)	15.32	12.43	27.75
Av. 1912-1913	7.66	6.22	13.88
1913-14			
Av. 2d 6 mos. 1913.....	8.03	2.74	10.77
Av. 1st 6 mos. 1914.....	3.23	19.06	22.29
2)	11.26	21.80	33.06
Av. 1913-1914	5.63	10.90	16.53
1914-15			
Av. 2d 6 mos. 1914.....	11.34	6.25	17.60
Av. 1st 6 mos. 1915.....	2.78	20.41	23.19
2)	14.12	26.66	40.79
Av. 1914-1915	7.06	13.33	20.39

**Exhibit 12 w Recast to Fiscal Years. Being Water Drawn Monthly From Different Sources 1907-14,
In Million Gallons Daily**

1907-08

	1908													
	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	Total	Aver.
Alameda	164	16.9	16.7	16.2	16.7	15.8	14.9	16.6	16.7	16.9	16.7	16.2	196.7	16.4
Crystal Springs	3.2	3.4	2.9	3.5	2.0	2.9	2.7	2.7	2.1	2.0	2.4	3.3	33.1	2.7
San Andreas	8.3	8.2	7.2	10.1	9.9	10.4	10.2	9.9	10.0	10.1	9.7	10.2	114.2	9.5
Merced	3.8	5.1	6.5	2.2	1.2	0.7	1.3	1.4	2.5	2.9	3.3	3.3	34.2	2.9
Total	31.7	33.6	33.3	32.0	29.8	29.8	29.1	30.6	31.3	31.9	32.1	33.0	378.2	31.5

	1909													
	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	Total	Aver.
Alameda	15.7	12.1	10.6	9.2	9.3	10.1	9.4	10.8	10.8	15.0	16.7	16.3	135.2	11.3
Crystal Springs	3.7	7.1	8.3	9.8	8.6	8.7	9.9	20.6	9.9	6.0	4.4	4.8	101.8	8.5
San Andreas	10.3	10.6	10.7	10.5	10.5	10.4	9.4	9.9	11.1	11.7	11.6	11.9	128.9	10.7
Merced	2.9	2.7	3.3	3.1	1.8	1.2	2.1	0.3	0.2	2.3	3.3	2.7	25.9	2.1
Total	32.6	32.5	32.9	32.6	30.2	30.4	30.8	30.8	32.0	35.0	36.0	35.7	391.8	32.6

1908-09

1909														
	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	Total	Aver.
Alameda	15.7	12.1	10.6	9.2	9.3	10.1	9.4	...	10.8	15.0	16.7	16.3	135.2	11.3
Crystal Springs	3.7	7.1	8.3	9.8	8.6	8.7	9.9	20.6	9.9	6.0	4.4	4.8	101.8	8.5
San Andreas	10.3	10.6	10.7	10.5	10.5	10.4	9.4	9.9	11.1	11.7	11.6	11.9	128.9	10.7
Merced	2.9	2.7	3.3	3.1	1.8	1.2	2.1	0.3	0.2	2.3	3.3	2.7	25.9	2.1
Total	32.6	32.5	32.9	32.6	30.2	30.4	30.8	30.8	32.0	35.0	36.0	35.7	391.8	32.6

1909-10

	1910												Total	Aver.
	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June			
Alameda	15.2	15.4	16.2	15.2	15.0	16.8	16.9	17.0	16.8	16.8	16.5	193.5	16.1	
Crystal Springs	5.6	6.2	5.6	5.0	4.9	3.7	5.6	4.7	5.1	5.5	7.2	64.1	5.3	
San Andreas	12.1	8.7	7.6	7.1	10.4	9.6	9.1	7.0	7.1	7.9	11.3	109.9	9.2	
Merced	2.9	6.1	5.7	6.2	2.7	2.6	1.6	5.1	6.7	6.7	3.0	52.3	4.3	
Total	35.8	36.4	35.1	33.5	33.0	32.7	33.2	33.8	35.7	36.9	38.0	419.8	34.9	

1910-11

	1911												Total	Aver.
	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June			
Alameda	14.7	15.9	13.0	6.4	10.2	13.6	15.6	11.0	13.2	16.6	16.5	16.9	163.6	13.6
Crystal Springs	8.6	6.8	9.7	15.2	10.6	8.0	6.6	11.2	9.0	5.6	7.5	6.9	105.7	8.8
San Andreas	11.2	11.6	8.9	8.5	7.5	5.3	7.2	9.0	12.7	14.9	13.9	14.0	124.7	10.4
Merced	3.2	3.2	5.5	5.9	5.9	6.7	3.9	2.6	0.6	...	1.3	1.4	40.2	3.3
Total	37.7	37.5	37.1	36.0	34.2	33.6	33.3	33.8	35.5	37.1	39.2	39.2	434.2	36.1

1911-12

1912														
	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	Total	Aver.
Alameda	15.1	16.3	15.1	16.4	17.0	17.0	16.7	16.9	16.5	16.7	16.7	16.6	197.0	16.4
Crystal Springs	8.6	7.4	8.9	7.7	5.0	4.4	3.9	3.9	5.9	10.4	10.1	14.1	90.3	7.5
San Andreas	11.8	12.0	12.2	11.0	9.9	8.1	7.7	7.7	9.3	8.7	9.1	9.1	116.6	9.7
Merced	3.6	3.3	3.7	4.0	5.1	7.2	7.3	7.1	4.4	1.4	2.2	1.4	50.7	4.2
Total	39.1	39.0	39.9	39.1	37.0	36.7	35.6	35.6	36.1	37.2	38.1	41.2	454.6	37.8

1912-13

	1913													
	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	Total	Aver.
Alameda	12.8	10.8	7.4	9.2	7.8	10.5	13.3	16.5	16.8	20.1	16.8	13.9	155.9	13.1
Crystal Springs	16.7	13.3	19.6	18.1	19.0	18.6	16.3	14.5	14.2	11.8	14.3	16.0	197.4	16.45
San Andreas	10.3	12.1	15.8	16.0	12.3	5.5	2.8	3.1	1.9	2.1	3.3	3.2	88.4	7.37
Merced .....	...	...	...	...	0.1	4.6	6.6	4.7	5.3	6.6	6.2	6.5	40.6	3.4
Total	39.8	41.2	42.8	43.3	39.2	39.2	39.0	38.8	38.2	40.6	40.6	39.6	482.3	40.2

1913-14

1914													
	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	Total	Aver.
Alameda	7.6	10.	9.2	10.2	12.1	18.4	21.4	20.8	20.4	19.3	21.1	181.5	15.1
Crystal Springs	20.9	21.2	20.6	16.1	20.3	10.8	3.	2.9	0.4	1.9	10.8	142.4	11.88
San Andreas	9.9	7.9	8.8	7.7	1.0	4.2	9.4	12.0	12.9	15.5	2.1	99.4	8.3
Merced	4.5	3.2	3.2	2.8	3.5	3.6	3.8	3.8	4.4	3.7	5.1	47.8	3.98
Total	41.0	42.3	41.8	36.8	36.9	37.0	37.6	39.5	38.1	40.4	39.1	471.1	39.25

[1]

SUPPLEMENTAL REPORT

On August 7, 1917, the foregoing report was announced to the parties in language and form as it now appears, except for such slight changes as are herein referred to, and copies of the same were furnished to the attorneys for the plaintiff and for the defendant. The parties were given until September 7, 1917, to serve and file with the master their objections to the report. This time was extended, for the defendant, until September 17, 1917, and for the plaintiff until September 20th following. Within these periods each party filed written objections to the draft report and these are herewith separately returned. On August 27, 1917, the city moved to re-open the proceedings for the purpose of taking additional testimony of M. M. O'Shaughnessy with reference to the matter of water rights, which motion was supported by an affidavit of Mr. O'Shaughnessy. The moving papers are separately returned. On August 28th following, after argument had been had and the matter taken under submission, I granted the motion to re-open, for the reason that I desired to correct any injustice to Mr. O'Shaughnessy in the draft report, and also desired, without reference to formal rules governing the reopening of cases, to hear all the evidence which the city could produce upon the subject matter. The further hearing was had in the presence of counsel for both parties on August 30, 1917, and a transcript of the proceedings, entitled Volume 155, is also separately returned as part of the evidence which I have considered in making my final report.

The matter before me now is to consider this additional evidence and also the correctness of the draft report, in view of the objections of the parties. I have re-read the report in the light of the objections, each one of which I have considered carefully, and have re-read the additional evidence of Mr. O'Shaughnessy. [2] In the main it may be said that the points raised by the objections, both of plaintiff and of defendant, represent matter which had been considered upon the argument, and generally treated with fullness in the report. Underlying many of the objections of the city there is to be found, I think, a misapprehension of the report which will be apparent on a closer and more careful reading. Under these circumstances, further comment is, in general, unnecessary.

All of the objections of plaintiff have been considered and are overruled.

The objections of the city, 100 in number, have also been carefully considered, and seem to me, in general, without merit. Such

comments as I make will, in general, extend to those objections which seem to show that the report should be made more definite and certain, and are not intended to emphasize the importance of the objections particularly commented upon.

In objection 9, paragraph third, there is disclosed a misapprehension of the master's point of view in the valuation of lands. This misapprehension will be found to exist and to underlie other of the defendant's objections. Taking the watershed lands on the peninsula as an example, I found the value of those lands, without including therein any rights to divert water from the streams flowing through them and without any rights of access to the lakes, so that there is no duplication in valuing watershed lands, lakes and water rights separately. In other words, if it were possible to assure the purity of the water and the continuation of its maximum production without the use of watershed for protection and forestation, the land could have been sold at the market values of my appraisal; or, on the other hand, assuming ownership of the reservoirs and the diversion rights in the amounts given, the lands could have been bought in the market for the values given—in each case disregarding any [3] expenses of acquisition or sale.

Objection 15 and objection 35 are pointed at a method of treatment in the report several times adopted, where I stated the evidence of the defendant first and then the evidence of the plaintiff. This did not mean, as the objection states, that I weighed the city's evidence first, or that I cast upon them a burden of proof that was not justly theirs. Throughout the case the evidence of plaintiff was first weighed and then that of the defendant, and then that of the plaintiff in rebuttal. But as a matter of literary exposition, as distinctly stated in the report, page 65, in cases where my opinion coincided with the views of the plaintiff's witnesses it was desirable to describe the evidence which my preliminary consideration showed to be not persuasive and then the views of those witnesses which, either as given or as modified in accordance with my judgment, would naturally precede the exposition of my considered views. I have throughout cast the burden of proof upon the plaintiff to the best of my reasoning ability, and am not convinced that anywhere in the report is there to be found any inconsistency between my principles thus announced and my practice in that regard. Moreover, when the city states in objection 15 that in relation to evidence of reservoir values "the rule of evidence should require the weighing of the plaintiff's testimony first and if

not satisfactory no allowance should be made in excess of that conceded by the defendant," the powers of any judicial officer in considering evidence are too narrowly restricted. In all my consideration of the opinion evidence in this case, whether of real estate values or otherwise, I have followed my own judgment as it was informed by the evidence of witnesses, by the evidence of inspection in the field, and by the operation of proper reasoning upon all [4] the facts. If the value of a certain tract of land was in question I felt at entire liberty to adopt the opinion of either witness as to the value or to appraise it at an intermediate figure or a figure either higher or lower than any witness, according as on the whole case I considered that the facts justified it.

In objection 65, paragraph 6, in objection 83, and perhaps elsewhere, there is comment upon my method of considering Judge Farrington's decision in the prior case, which leaves the impression that the city's attorney believes that I have followed that decision when it was favorable to the company and have not done so when it was favorable to the city. This criticism should not have been made. I have stated in the report, page 5, page 116 and elsewhere, the influence which I have given to this decision. Where the question was of market value, and comparable sales did not afford a complete guide, it seemed to me that the opinion of one in authority would have influence in crystallizing the opinions of buyers and sellers in a matter not capable of exact computation or clear ascertainment by other means. With regard to going value, I have pointed out that Judge Farrington approved, as indeed he must, in view of the decisions of the Supreme Court, the rule that a going concern value must be recognized, but found it impossible, on the proof in the case before him, to ascertain that amount definitely. It is true that my allowance for overhead in the construction estimates is greater than that of the learned judge because of the evidence in this case. But that is a matter of more or less exact computation and opinion, and I am bound by the evidence here (including evidence of defendant's witnesses which is higher than that of the learned judge). The city should likewise bear in mind that my appraisal of watershed lands, of submarine pipes, and doubtless of many other items of property is lower than that reached in the prior case.

[5] In Objection 32, the city presents a criticism of the report at pages 100 and 101 which may, as a formal matter, be sustained. I stated, page 100, that Judge Farrington, in determining the value

of plaintiff's water rights "found a value for the year 1903-04 of approximately \$63,600 per M. G. D. average delivery," and said on the next page that "he evidently concluded that the rights throughout the system could be valued at a uniform unit of value." There is an unintentional misrepresentation of the decision in that the figure of \$63,600 was not mentioned in the decision. He pointed out, as I stated, that water rights at different places throughout the system would differ in value, and finally valued all of the rights at \$2,100,000, as the quotation shows. The unit figure per million gallons daily of \$63,600 was a resultant by computation of the given amount of water used of 33,000,000 gallons daily. While, therefore, I correct any error that may result from my method of stating the case, it does not seem to me that the language used, with this explanation, need be changed.

In objection 98, paragraph first, and also in objection 99, it is stated that the rates of return found by me as fair under varying methods of valuation are not in form findings of the "minimum fair rate of return, which is the only finding this court is entitled to make." The context of the report, I think, makes it perfectly apparent that this was the intent of the finding, and so the city seems to regard it in Objection 2. To obviate any uncertainty, I state now that those were intended to be in form findings of minimum fair rates.

There remains for discussion only objection 46, especially paragraph fourth thereof, as to Mr. O'Shaughnessy's testimony touching the value of complainant's water rights. In my treatment of that difficult subject I was desirous of all the information [6] which the evidence afforded that would enable me to reach the truth so far as the nature of the subject-matter made it possible to determine it. Mr. O'Shaughnessy did not, at the original hearing, testify as to his opinion of the value of complainant's water rights as a whole, but, as stated in the report, he did give evidence upon a related subject-matter from which inferences could be drawn by a method of computation. There is no need to rehearse all the considerations which led to my final judgment. At page 116 I did state that I thought, in view of all the considerations named, and of his testimony at the original hearing, Mr. O'Shaughnessy would have, if he had been asked, agreed with the figure I reached. Having now weighed his testimony at the re-opening of the case on the valuation of plaintiff's rights of diversion I still am of the opinion that consistency as between his testimony first given and

his later testimony would have required him to agree, or at least substantially so, with the figure which I determined. I was, however, wrong in saying that if asked he would have agreed, because it now appears by his recent testimony that he values these rights at a unit of \$64,000 per million gallons daily. I see no reason, however, why I should change the language of the report to this slight extent. It is, of course, hard to say now whether if I had had the benefit of Mr. O'Shaughnessy's evidence when I was first reviewing the evidence, it would have operated on my mind to reach a lower final value than I did. But I was prepared, when I reopened the case, to revise my conclusions in the light of his evidence, without any prejudice in favor of my formed opinion. I have carefully gone over his later evidence and find no reason to change my judgment first formed. The witness had the advantage of my views fully stated in the draft report. He has not attempted to show in what respects my inferences from his testimony in the first case are in error. He has not attempted [7] to show by any well-defined line of reasoning how he has reached his adopted unit value of \$64,000 per M. G. D. There is nothing mysterious about the science of engineering, and so I have required all witnesses in this case to justify their opinions by some disclosed line of reasoning. There will be subjects such as this very one of the value of rights of diversion of water upon which exactness of reasoning to the degree of a mathematical computation is inherently impossible, but some reasoning process antecedent to judgment must be gone through and can be disclosed. Mr. O'Shaughnessy does give the matters which he has considered, namely, general observation of the value of water rights throughout the State of California, and local conditions in the neighborhood of San Francisco Bay (page 11224), specific illustrations of value, such as \$200 or \$300 a miners' inch at Eureka, where there is a limited use and superabundance of water, \$1500 or \$2000 an inch in southern California (page 11225), the cost of bringing the water supply to the point of application (page 11225), and like general observations. He speaks of rights of diversion adjacent to Los Angeles being worth \$3000 an inch, at Pasadena \$2000 an inch (to be multiplied by the factor 77.4, to give the equivalent measured in million gallons daily), of \$116,000 per M. G. D. at the source of supply of San Diego, or \$129,000 for the same supply measured by the amount delivered as here. Considering the question of relative cost of delivery and the supply and demand as between southern California

and points around San Francisco Bay, there is room for a difference of valuation between water rights there and water rights here, but considering those facts baldly one can as easily reach the figure of complainant's witnesses of \$100,000 per M. G. D., the master's figure of \$85,000, and Mr. O'Shaughnessy's figure of \$64,000. In other words, the witness has given no reason why his figures should be preferred. Mr. O'Shaughnessy states [8] definitely that in adopting \$64,000 as his unit of value he has not rounded out Judge Farrington's computed results of \$63,600, but I am convinced that his memory is at fault and that that is just what he has done. But since Judge Farrington's figure was for the year 1903, the witness has allowed nothing for any appreciation of value which the evidence convinces me should be allowed for, in view of the conditions of demand and supply.

Accordingly, Objection 32 of the city is sustained and all other objections are overruled. Failure to comment on objections must not be considered as an evidence that they have not been carefully weighed.

Since the draft report was announced, the following changes have been made in language or figures, either upon my own initiative or upon suggestion of the parties, as follows:

Page	Line	Correction
2		Omit "as set forth in the list of exhibits appended hereto."
6	6 —bottom	Change "1913" to "1914."
11	9 and 10—top	Omit "including the small separate reservoir at the Stone Dam."
120	12—bottom	Change "200" to "2000."
206	6 —bottom	Change "4,556,000" to "4,566,000."
227	6 —top	Change "1,936,000" to "1,631,000."
227	13—top	Change "8,107,000" to "7,802,000."
264	3 —bottom	Change "reason" to "reasoning."
283	9 and 10—top	Change "the best method for estimating a value for the going plant treating it on broad lines" to "a method for estimating a value for the going plant, treating it on broad lines, which deserves very careful consideration."
294	1	Change "March and September" to "March, June and September."
294	5	Change "\$30" to "\$3."
324	2 —bottom	Change "p. 5" to "p. 7."

I have also changed the form of the note on page 260 of the report.

In addition to suggestions of change which have been adopted as above, the parties have, by agreement, submitted to me, not as objections, but in the interest of precision, a number of errors in figures. I must assume from the agreement of the parties that they were errors, though I have not thought it necessary to check them. [9] Some of these were errors in computations contained in the evidence, others errors in computations by the master, and many of these originally made have been extended to the subsequent computations. So far as they concern the values of the property, the net result has been to make the detailed valuations shown, for example on page 288, too large in favor of the plaintiff by amounts varying from approximately \$7,000 to \$20,000 in various years. Since, however, I have rounded off precise figures in my final computation of the value of the property, and since errors of this size are without significance in the final result, I have not thought it necessary to make a correction that would not weigh in the final conclusion. There are other errors in the figures given which I have hesitated to correct because of the labor involved in checking up at other points in the report. None are critical, as is evidenced by the fact that the parties have not made them the subject of objections. However, in the interest of precision, these agreed errors are as follows:

Page	Line	Correction
38	8—bottom, change	\$2,264,143 to \$2,248,471
38	7— “ “	2,264,143 “ 2,248,471
38	6— “ “	2,264,143 “ 2,248,471
38	5— “ “	2,149,964 “ 2,135,076
38	4— “ “	1,965,339 “ 1,951,234
38	3— “ “	1,817,072 “ 1,790,732
38	2— “ “	1,681,483 “ 1,655,143
38	1— “ “	1,643,301 “ 1,616,962
39	14— “ “	297,583 “ 293,183
42	10-11-12	“ 3,296,932 “ 3,302,932
42	9— “	“ 3,175,349 “ 3,181,349
42	8— “	“ 1,606,802 “ 1,612,802
42	7— “	“ 1,596,627 “ 1,602,627
42	6— “	“ 1,588,680 “ 1,594,680
42	5— “	“ 1,588,680 “ 1,594,680
116	2—top “	“ 459,000 “ 449,000
116	4— “ “	“ 541,000 “ 551,000

	Page	Line		Correction
	116	6—top	change	\$1,459,000 to \$1,449,000
	116	12— “	“	1,581,000 “ 1,571,000
	237	2— “	“	2,027,649 “ 2,011,977
	237	5— “	“	1,925,295 “ 1,910,407
	237	6— “	“	1,793,985 “ 1,779,879
	237	7— “	“	1,675,892 “ 1,649,552
	237	8— “	“	1,594,788 “ 1,568,448
	237	9— “	“	1,556,607 “ 1,530,267
[10]	244	13—top	change	\$3,170,228 to \$3,176,228
	244	14— “	“	3,170,228 “ 3,176,228
	244	15— “	“	3,170,228 “ 3,176,228
	244	16— “	“	3,048,645 “ 3,054,645
	244	17— “	“	1,449,007 “ 1,505,007
	244	18— “	“	1,488,832 “ 1,494,832
	244	19— “	“	1,480,885 “ 1,486,885
	244	20— “	“	1,480,885 “ 1,486,885
	245	12— “	“	1,556,607 “ 1,530,267
	245	12— “	“	1,594,788 “ 1,568,448
	245	12— “	“	1,675,892 “ 1,649,552
	245	12— “	“	1,793,985 “ 1,779,879
	245	15— “	“	1,480,885 “ 1,486,885
	245	15— “	“	1,480,885 “ 1,486,885
	245	15— “	“	1,488,832 “ 1,494,832
	245	15— “	“	1,499,007 “ 1,505,007
	245	18— “	“	9,456,047 “ 9,435,707
	245	18— “	“	9,494,228 “ 9,473,888
	245	18— “	“	9,654,883 “ 9,634,543
	245	18— “	“	10,251,911 “ 10,243,805
	245	23— “	“	31,019,547 “ 30,999,207
	245	23— “	“	31,123,228 “ 31,102,888
	245	23— “	“	31,520,883 “ 31,500,543
	245	23— “	“	32,237,765 “ 32,229,659
	246	5— “	“	1,925,295 “ 1,910,407
	246	5— “	“	2,027,649 “ 2,011,977
	246	5— “	“	2,027,649 “ 2,011,977
	246	5— “	“	2,027,649 “ 2,011,977
	246	8— “	“	3,048,654 “ 3,054,645
	246	8— “	“	3,170,228 “ 3,176,228
	246	8— “	“	3,170,228 “ 3,176,228
	246	8— “	“	3,170,228 “ 3,176,228
	246	11— “	“	12,239,511 “ 12,230,623
	246	11— “	“	12,932,208 “ 12,922,536
	246	11— “	“	12,932,208 “ 12,922,536
	246	11— “	“	12,932,208 “ 12,922,536

Page	Line	Correction
246	1—bottom change	\$34,458,543 to \$34,449,655
246	1— “ “	35,192,305 “ 35,182,633
246	1— “ “	35,633,512 “ 35,623,840
246	1— “ “	35,613,242 “ 35,603,570
288	4—top	“ 31,019,547 “ 30,999,207
288	4— “ “	“ 32,919,547 “ 32,899,207
288	5— “ “	“ 31,123,228 “ 31,102,888
288	5— “ “	“ 33,423,228 “ 33,402,888
288	6— “ “	“ 31,520,883 “ 31,500,543
288	6— “ “	“ 34,220,883 “ 34,200,543
288	7— “ “	“ 32,237,765 “ 32,229,659
288	7— “ “	“ 35,137,765 “ 35,129,659
288	8— “ “	“ 34,458,543 “ 34,449,655
288	8— “ “	“ 37,458,543 “ 37,449,655
288	9— “ “	“ 35,192,305 “ 35,182,633
288	9— “ “	“ 38,392,305 “ 38,382,633
288	10— “ “	“ 35,633,512 “ 35,623,840
288	10— “ “	“ 39,033,512 “ 39,023,840
288	11— “ “	“ 35,613,242 “ 35,603,570
288	11— “ “	“ 39,013,242 “ 39,003,570
307	6— “ “	357,392.70 to 358,392.70

Appendix:

	7	17—bottom change	\$517,235 to	\$523,235
	8	7—top “	4,508 “	4,558
	12	5— “ “	517,235 “	523,235
[11]	Page	Line	Correction	
	12	13—top, change	\$3,296,932 to	\$3,302,932
	12	14— “ “	67.23 “	67.35
		3—bottom “	21,962.97 “	21,941.72
		“	2,264,143 “	2,248,471

At the desire of the parties I return also with the final report a printed transcript of their arguments. This follows the original transcript, also returned, heretofore referred to, except that it has been to some extent revised. My references to pages of the argument throughout this report are to the type-written transcript.

Accordingly, the foregoing draft report, together with this supplemental report, is hereby settled, signed and filed as my final report herein, and the parties notified thereof by mail this 16th day of October, 1917.

H. M. WRIGHT,
Standing Master in Chancery.

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